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TRANSACTIONS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

VOL. XXVII

FOR THE YEAR 1914

Edited by E. Gustav Zinke, M.D., F.A.C.S.
Cincinnati

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AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS

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NOTE.

The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

DR. E. GUSTAV ZINKE, *Secretary*,
4 W. Seventh Avenue, Cincinnati

[Minutes and discussions stenographically reported by William Whitford, Chicago, Ill.]

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CONSTITUTION AND BY-LAWS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

TOGETHER WITH

MINUTES OF THE TWENTY-SEVENTH ANNUAL MEETING

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

CONSTITUTION.

I. The name of this Association shall be THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

II. Its object shall be the cultivation and promotion of knowledge in whatever relates to Abdominal Surgery, Obstetrics, and Gynecology.

MEMBERS.

III. The members of this Association shall consist of Ordinary Fellows, Honorary Fellows, Corresponding Fellows, and Senior Fellows.

The Ordinary Fellows shall not exceed one hundred and fifty in number.

The Honorary Fellows shall not exceed ten American and twenty-five foreign.

Candidates shall be proposed to the Executive Council at least one month before the first day of meeting, by two Fellows, and shall be balloted for at the annual meeting, a list of names having been sent to every Fellow with the notification of the meeting.

A two-thirds vote in the affirmative of all the members present shall be necessary to elect—fifteen Fellows at least being in attendance.

All candidates for active fellowship shall submit to the Executive Council, at least one month before the annual meeting, an original paper relating to Abdominal Surgery, Obstetrics, or Gynecology.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Executive Council.

Their election shall take place in the same manner as that of Ordinary Fellows.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, but shall not be required to pay any fee.

CORRESPONDING FELLOWS.

V. The Corresponding Fellows shall be recommended by the Executive Council and elected by the Association.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, and shall be entitled to a copy of the annual TRANSACTIONS.

They shall pay an annual fee of five dollars.

SENIOR FELLOWS.

Senior Fellows shall be nominated by the Executive Council, and elected by the Association as provided for in the election of Honorary Fellows, and they shall enjoy the same privileges as are accorded Corresponding Fellows.

OFFICERS.

VI. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and six Executive Councillors.

The nomination of all officers shall be made in open session at the business meeting, and the election shall be by ballot.

The first five officers shall enter upon their duties immediately before the adjournment of the meeting at which they shall be elected, and shall hold office for one year.

"At the election next succeeding the adoption of these laws, the full number of Executive Councillors shall be elected; two for a term of three years, two for a term of two years, and two for a term of one year.

"At every subsequent election two Councillors shall be elected for a term of three years, and shall continue in office until their successors shall have been elected and shall have qualified."[1]

Any vacancy occurring during the recess may be filled temporarily by the Executive Council.

ANNUAL MEETINGS.

VII. The time and place of holding the annual meeting shall

[1] Amendment adopted September 21, 1898.

be determined by the Association or may be committed to the Executive Council each time before adjournment.

It shall continue for three days, unless otherwise ordered by vote of the Association.

AMENDMENTS.

VIII. This Constitution may be amended by a two-thirds vote of all the Fellows present at the annual meeting: *provided*, that notice of the proposed amendment shall have been given in writing at the annual meeting next preceding: and *provided, further*, that such notice shall have been printed in the notification of the meeting at which the vote is to be taken.

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

BY-LAWS.

THE PRESIDING OFFICER.

I. The President, or in his absence, one of the Vice-Presidents, shall preside at all meetings, and perform such other duties as odinarily pertain to the Chair.

The presiding officer shall be *ex-officio* chairman of the Executive Council, but shall vote therein only in case of a tie.

SECRETARY.

II. The Secretary shall attend and keep a record of all meetings of the Association and of the Executive Council, of which latter he shall be *ex-officio* clerk, and shall be entitled to vote therein.

He shall collect all moneys due from the members, and shall pay the same over to the Treasurer, taking his receipt therefor.

He shall supervise and conduct all correspondence of the Association; he shall superintend the publication of the TRANSACTIONS under the direction of the Executive Council, and shall perform all the ordinary duties of his office.

He shall be the custodian of the seal, books, and records of the Association.

TREASURER.

III. The Treasurer shall receive all moneys from the Secretary, pay all bills, and render an account thereof at the annual meetings, when an Auditing Committee shall be appointed to examine his accounts and vouchers.

EXECUTIVE COUNCIL.

IV. The Executive Council shall meet as often as the interests of the Association may require. The President, or any three members may call a meeting, and a majority shall constitute a quorum.

It shall have the management of the affairs of the Association, subject to the action of the house at its annual meetings.

It shall have control of the publications of the Association, with full power to accept or reject papers or discussions.

It shall have control of the arrangements for the annual meetings, and shall determine the order of the reading of papers.

It shall constitute a court of inquiry for the investigation of all charges against members for offences involving law or honor; and it shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Association shall be as follows:

1. General meeting at 10 o'clock A. M.
   a. Reports of Committees on Scientific Questions.
   b. Reading of Papers and Discussion of the same.
2. One business Meeting shall be held at half-past nine o'clock A. M. on the first day of the session, and another on the evening of the second day (unless otherwise ordered by vote), at which only the Fellows of the Association shall be present. At these meetings the Secretary's record shall be read; the Treasurer's Accounts submitted; the reports of Committees on other than scientific subjects offered; and all Miscellaneous Business transacted.

PAPERS.

VI. The titles of all papers to be read at any annual meeting shall be furnished to the Secretary *not later* than one month before the first day of the meeting.

No paper shall be read before the Association that has already been published, or that has been read before any other body.

Not more than thirty minutes shall be occupied in reading any paper before the Association.

Abstracts of all papers read should be furnished to the Secretary at the meeting.

All papers read before the Association shall become its sole property if accepted for publication; and the Executive Council may decline to publish any paper not handed to the Secretary *complete* before the final adjournment of the annual meeting.

QUORUM.

VII. The Fellows present shall constitute a quorum for all business, excepting the admission of new Fellows or acting upon amendments to the Constitution, when not less than fifteen Fellows must be present.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at any meeting, except when introduced by the Executive Council.

FINANCE.

IX. Each Fellow, on admission, shall pay an initiation fee of twenty-five dollars, which shall include his dues for the first year.

Every Fellow shall pay, *in advance* (*i.e.*, at the beginning of each fiscal year) the sum of twenty dollars annually thereafter.

[A fiscal year includes the period of time between the first day of one annual meeting and the first day of the next.]

Any Fellow neglecting to pay his annual dues for two years may forfeit his membership, upon vote of the Executive Council.

The Secretary shall receive, annually, a draft from the President, drawn on the Treasurer, for a sum, to be fixed by the Executive Council, for the services he shall have rendered the Association during the year.

A contingent fund of one hundred dollars shall be placed annually at the disposal of the Secretary for current expenses, to be disbursed by him, and for which he shall present proper vouchers.

ATTENDANCE.

X. Any Fellow who shall neither attend nor present a paper for five consecutive years, unless he offer a satisfactory excuse, shall be dropped from fellowship, upon vote of the Executive Council.

RULES.

XI. *Robert's Rules of Order* shall be accepted as a parliamentary guide in the deliberations of the Association.

AMENDMENTS.

XII. These By-Laws may be amended by a two-thirds vote of the Fellows present at any meeting; *provided*, previous notice in writing shall have been given at the annual meeting next preceding the one at which the vote is to be taken.

OFFICERS FOR 1914–1915

PRESIDENT

CHARLES L. BONIFIELD, Cincinnati

VICE-PRESIDENTS

ASA B. DAVIS, New York
K. ISADORE SANES, Pittsburgh

SECRETARY

E. GUSTAV ZINKE, Cincinnati

TREASURER

HERMAN E. HAYD, Buffalo

EXECUTIVE COUNCIL

JOHN W. KEEFE, Providence
X. O. WERDER, Pittsburgh
LOUIS FRANK, Louisville
MILES F. PORTER, Fort Wayne
CHARLES N. SMITH, Toledo
HUGO O. PANTZER, Indianapolis

LIST OF OFFICERS.

From the Organization to the Present.

	President.	*Vice-Presidents.*	*Secretary.*	*Treasurer.*
1888.	Taylor, Wm. H.	Montgomery, E. E. Carstens, J. H.	Potter, Wm. W.	Werder, X. O.
1889.	Montgomery, E. E.	Myers, W. H. Banta, R. L.	Potter, Wm. W.	Werder, X. O.
1890.	Wright, A. H.	Rohé, G. H. Hall, R. B.	Potter, Wm. W.	Werder, X. O.
1891.	Vander Veer, A.	Hill, H. E. Morris, R. T.	Potter, Wm. W.	Werder, X. O.
1892.	McMurtry, L. S.	Ill, Ed. J. Longyear, H. W.	Potter, Wm. W.	Werder, X. O.
1893.	Rohé, Geo. H.	Manton, W. P. Hulbert, Geo. F.	Potter, Wm. W.	Werder, X. O.
1894.	Carstens, J. H.	Davis, W. E. B. Howitt, H.	Potter, Wm. W.	Werder, X. O.
1895.	Price, Joseph	Cordier, Al. H. Peck, G. S.	Potter, Wm. W.	Werder, X. O.
1896.	Ross, J. F. W.	Johnston, G. B. Sexton, J. C.	Potter, Wm. W.	Werder, X. O.
1897.	Reed, C. A. L.	Douglas, R. Dorsett, W. B.	Potter, Wm. W.	Werder, X. O.
1898.	Ill, Edward J.	Ricketts, Ed. Miller, A. B.	Potter, Wm. W.	Werder, X. O.
1899.	Hall, R. B.	Dunning, L. H. Crofford, T. J.	Potter, Wm. W.	Werder, X. O.
1900.	Davis, W. E. B.	Walker, Ed. Goldspohn, A.	Potter, Wm. W.	Werder, X. O.
1901.	Ricketts, E.	Cumston, C. G. Porter, M. F.	Potter, Wm. W.	Werder, X. O.
1902.	Dunning, L. H.	Rosenwasser, M. Hayd, H. E.	Potter, Wm. W.	Werder, X. O.
1903.	Dorsett, W. B.	Miller, A. B. Haggard, W. D.	Potter, Wm. W.	Werder, X. O.
1904.	Longyear H. W.	Gilliam, D. T. Brown, J. Y.	Potter, Wm. W.	Werder, X. O.
1905.	Brown, J. Y.	West, J. N. Simpson, F. F.	Potter, Wm. W.	Werder, X. O.
1906.	Morris, R. T.	Crile, G. W. Bonifield, C. L.	Potter, Wm. W.	Werder, X. O.
1907.	Zinke, E. G.	Keefe, J. W. Sellman, W. A. B.	Potter, Wm. W.	Werder, X. O.
1908.	Humiston, Wm. H.	Sadlier, J. E. Davis, J. D. S.	Potter, Wm. W.	Werder, X. O.
1909.	Miller, A. B.	Smith, C. N. Huggins, R. R.	Potter, Wm. W.	Werder, X. O.
1910.	Hayd, H. E.	Schwarz, H. Morris, L. C.	Potter, Wm. W.	Werder, X. O
1911.	Werder, X. O.	Frank, L. Tate, M. A.	Zinke, E. G.	Hayd, H. E.
1912.	Porter, M. F.	Smith, C. N. Sadlier, J. E.	Zinke, E. G.	Hayd, H. E.
1913.	Smith, C. N.	Pantzer, H. O. Branham, J. H.	Zinke, E. G.	Hayd, H. E.
1914.	Bonifield, C. L.	Davis, A. B. Sanes, K. I.	Zinke, E. G.	Hayd, H. E.

HONORARY FELLOWS.

1899.—Ballantyne, John William, M.D., F.R.C.P.E., F.R.S, Edin. Lecturer on Midwifery and Gynecology, School of Medicine of the Royal Colleges, Surgeons' Hall, Edinburgh; Physician to the Royal Maternity Hospital, Edinburgh; formerly President of the Edinburgh Obstetrical Society; Examiner in Midwifery in the University of Edinburgh; Honorary Fellow of the Glasgow Obstetrical and Gynecological Society. 19 Rothesay Terrace, Edinburgh, Scotland.

1889.—Bantock, George Granville, M.D., F.R.C.S. Ed. Surgeon to the Samaritan Free Hospital. Broad Meadow, King's Norton, Birmingham, England.

1889.—Barbour, Sir A. H. Freeland, M.A., B.S.C., M.D. F.R.C.P. Ed., F.R.S. Ed. Lecturer on Midwifery and Diseases of Women in the Edinburgh Medical School; Assistant Physician to the Royal Maternity Hospital; Assistant Physician for Diseases of Women to the Royal Infirmary; Physician to the Women's Dispensary; Fellow of the Edinburgh and London Obstetrical Societies, and of the British Gynecological Society; Corresponding Fellow of the Royal Academy of Medicine, Turin. 4 Charlotte Square, Edinburgh, Scotland.

1909.—Crofford, Thomas Jefferson, M.D. Rex Arms Apartments, Orange St., Los Angeles, California.

1889.—Croom, Sir J. Halliday, M.D., F.R.C.P.E., F.R.C.S.E., F.R.S.E. Professor of Midwifery in the University of Edinburgh; Consulting Physician to the Royal Infirmary; Physician to the Royal Maternity Hospital; late President of the Royal College of Surgeons, Edinburgh. 25 Charlotte Square, Edinburgh, Scotland.

1891.—Fernandez, Juan Santos, M.D. Prado, No. 105, Havana, Cuba.

1889.—Freund, William Alexander, M.D. Emeritus Professor and Director of the Clinic for Diseases of Women in the University of Strassburg. Kleiststrasse 9, Berlin W., Germany.

1912.—Gilliam, David Tod, M.D. Emeritus Professor of Gynecology, Starling-Ohio Medical College; Gynecologist to St. Anthony Hospital; Member of the American Medical Association, Ohio State Medical Association, Columbus Academy of Medicine; Honorary Member of the Northwestern Ohio Medical Association; Ex-president, Franklin County Medical Society; *Vice-president*, 1905. 333 East State Street, Columbus, Ohio.

1894.—Jacobs, Charles, M.D. Professor of the Faculty of Medicine of Brussels; Secretary-General of the Permanent Committee of the Periodic International Congress of Gynecology and Obstetrics; Honorary President of the Belgian Society of Gynecology and Obstetrics; Honorary Fellow of the Gynecological Societies of New York and Chicago; Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Gynecological Society of Paris; Surgeon to the Brussels Polyclinic. 53 Boulevard de Waterloo, Brussels, Belgium.

1905.—McGraw, Theodore A., M.D. 73 Cass Street, Detroit, Mich.

1890.—Martin, August, M.D. Emeritus Professor of Gynecology in the University of Greifswald. Keithstrasse 14, Berlin W. 62, Germany.

1897.—Mathews, Joseph McDowell, M.D. Professor of Diseases of the Rectum and Clinical Surgery, Hospital College of Medicine; President of the Kentucky State Board of Health; First Vice-President American Medical Association, 1898; President, 1899. 411 The Masonic, Louisville, Kentucky.

1889.—Nicolaysen, Julius, M.D. Professor of Surgery in the University of Norway. Christiania, Norway.

1910.—de Ott, Dimitrij Oskarovic. Professor of Obstetrics and Gynecology in the Royal Pavloona Clinical Institute of St. Petersburg; President of the Fifth International Congress of Obstetrics and Gynecology. Wassily Ostrow, University Place, St. Petersburg, Russia.

1891.—Pietranera, E., M.D. Professor of Obstetrics in the Medical Department of the National University; Director of the Maternity Branch of the Clinical Hospital. 2711 Calle Rio Adaria, Buenos Ayres, Argentine Republic, S. A.

1889.—Schultze, Bernhard Sigmund, M.D. Professor of Gynecology; Director of the Lying-In Institute and of the Gynecological Clinic. 2 Sellierstrasse, Jena, Germany.

1896.—Sternberg, George Miller, A.M., M.D., LL.D. Surgeon General U. S. Army (Retired). 2005 Massachusetts Avenue, Washington, D. C.

1888.—Williams, Sir John, Bart., M.D., F.R.C.P. Blaen Llynant, Aberystwyth, Cardiganshire, Wales.

Total, eighteen Honorary Fellows.

HONORARY FELLOWS, DECEASED.

1892.—Boisliniere, L. Ch., A.B., M.D., L.L.D., Saint Louis, Mo., 1896.

1890.—Championniere, Just. Lucas, M.D., Paris, France, 1913.

1889.—Charpentier, Louis Arthur Alphonse, M.D., Paris, France, 1899.

1888.—Cordes, Auguste E., M.D., Geneva, Switzerland, 1914.

1890.—Corson, Hiram, M.D., Plymouth Meeting, Pa., 1896.

1889.—Dunlap, Alexander, A.M., M.D., Springfield, O., 1894.

1888.—Edis, Arthur Wellesley, M.D., Lond. F.R.C.S., M.R.S.C.S., London, England, 1893.

1889.—Eklund, Abraham Fredrik, M.D., Stockholm, Sweden. 1898.

1891.—Fisher, George Jackson, A.M., M.D., Sing Sing, N. Y, 1893.

1896.—Gaston, James McFadden, A.M., M.D., Atlanta, Ga., 1903.

1892.—Green, Traill, M.D., LL.D., Easton, Pa., 1897.

1889.—Keith, Thomas, M.D., London, England, 1896.

1889.—Leopold, G., M.D., Dresden, Germany, 1913.

1894.—Maclein, Donald, M.D., Detroit, Mich., 1903.

1895.—Mastin, Claudius Henry, M.D., LL.D., Mobile, Ala., 1898.

1891.—Moses, Gratz Ashe, M.D., Saint Louis, Mo., 1901.

1905.—Myers, William Herschel, M.D., Fort Wayne, Ind., 1907.

1889.—Saenger, Max, M.D., Prague, 1903.

1890.—Savage, Thomas, M.D., F.R.C.S. Eng., Birmingham, England, 1907.

1890.—Segond, Paul, M.D., Paris, France, 1913.

1899.—Sinclair, Sir William Japp, A.M., M.D., Manchester, England, 1913.

1894.—Slaviansky, Kronid, M.D., St. Petersburg, Russia, 1898.

1888.—Smith, J. Greig, M.A., C.M., M.B., F.R.S.E., Bristol, England, 1897.

1899.—Storrs, Melancthon, A.M., M.D., Hartford, Conn., 1900.

1888.—Tait, Lawson, M.D., LL.D., F.R.C.S.E., Birmingham, England, 1899.

1905.—Taylor, William Henry, M.D., *President*, 1888–1889, Cincinnati, Ohio, 1910.

1900.—Thornton, J. Knowsley, M.B., M.C., Cambridge, England, 1904.

1901.—Weber, Gustav C. E., M.D., LL.D., Willoughby, Ohio, 1912.

1889.—Von Winckel, F.M.D., Munich, Germany, 1912.

1905.—Wyman, Walter, M.D., Washington, D.C., 1911.

CORRESPONDING FELLOWS.

1899.—Beuttner, Oscar, M.D. Professor of the Faculty of Medicine. 2 Place de la Fasterie, Geneva, Switzerland.

1903.—Crozel, G., M.D. Professor Libre of Gynecology. Collonges au Mont d'Or (Rhone), France.

1914.—Das, Kedarnath, M.D. Professor of Midwifery and Gynecology, Campbell Medical School; Obstetrician and Gynecologist, Campbell Hospital, Calcutta; Examiner in Midwifery and Gynecology, Calcutta University; Examiner in Midwifery, College of Physicians and Surgeons, Bengal; Fellow, Royal Society of Medicine, London. 22, Bethune Row, Calcutta.

1903.—Ellis, Guilherme, M.D. Chief Surgeon to the Real Sociedade de Beneficencia Portuguese Hospital. 6 Rua Aurora, S. Paulo, Brazil, S. A.

1891.—Griffin, Herbert Spohn, B.A., M B., M.D., C.M. Surgeon to St. Joseph's Hospital; Gynecologist to Hamilton City Hospital; Examiner in Obstetrics, University of Toronto. 157 Main Street, Hamilton, Ontario, Canada.

1914.—Hertoghe, Eugene, M.D. Antwerp, Belgium.

1903.—Lane, Horace Manley, M.D., LL.D. President of Mackenzie College, S. Paulo, Brazil. 184 Rua da Consolacao, S. Paulo, Brazil, S. A.

1891.—Machell, Henry Thomas, M.D., L.R.C.P. Ed. Lecturer on Obstetrics, Women's Medical College; Surgeon to St. John's Hospital for Women; Physician to Victoria Hospital for Sick Children and to Hillcrest Convalescent Home. 95 Bellevue Avenue, Toronto, Ontario, Canada.

1898.—Wright, Adam Henry, B.A., M.D. Univ. Toronto, M.R.C.S., Eng. Professor of Obstetrics in the University of Toronto; Obstetrician and Gynecologist to the Toronto General Hospital and Burnside Lying-in Hospital, *President*, 1891. (Transferred from Ordinary List, 1898.) 30 Gerrard Street, East, Toronto, Ont., Canada.

Total, nine Corresponding Fellows.

SENIOR FELLOWS.

1913.—Blume, Frederick, M.D. Transferred from list of Ordinary Fellows. Gynecologist to the Allegheny General Hospital and Pittsburg Free Dispensary; Obstetrician to the Roselia Maternity Hospital; Consulting Gynecologist to the Mercy Hospital; President of the Pittsburg Obstetrical Society, 1892. Office, Jenkins Building, Pittsburg, Pa.

1911.—Lincoln, Walter Rodman, B.A., M.D. Transferred from list of Ordinary Fellows. Lecturer on Gynecology, College of Physicians and Surgeons of Cleveland. Lennox Building, corner Erie Street and Euclid Avenue, Cleveland, Ohio.

1913.—Stamm, Martin, M.D. Transferred from list of Ordinary Fellows. Professor of Operative and Clinical Surgery in the College of Physicians and Surgeons, Cleveland. 316 Napoleon Street, Fremont, Ohio.

ORDINARY FELLOWS.

1902.—Abrams, Edward Thomas, A.M., M.D., F.A.C.S. Consulting Surgeon to the Lake Superior General Hospital; Member of the Michigan State Medical Society; Member of the American Medical Association. Surgeon to St. Joseph's Hospital. Dollar Bay, Mich.

1895.—Bacon, Joseph Barnes, M.D., F.A.C.S. Professor of Rectal Diseases at the Post-Graduate Medical School; Instructor in Clinical Surgery in the Medical Department of Northwestern University, Chicago. Macomb, Ill.

1911.—Bainbridge, William Seaman, M.D., A.M., M.S., Sc.D. Adjunct Professor, New York Post-Graduate Medical School, 1902–6; Professor New York Polyclinic Medical School and Hospital since 1906; Surgeon, New York Skin and Cancer Hospital; Attending Surgeon, New York City Children's Hospitals and Schools; Consulting Surgeon, Manhattan State Hospital, New York Home for Dependent Crippled Children, College of Dental and Oral Surgery of New York and Tarrytown Hospital, Tarrytown, N. Y.; Consulting Gynecologist, St. Andrew's Hospital (New York) and St. Mary's Hospital, Jamaica, Long Island and the Ossining Hospital, Ossining, N. Y.; Assistant Surgeon, Medical Reserve Corps, United States Navy; Honorary President International Congress for Study of Tumors and Cancers, Heidelberg, Germany, 1906. 34 Gramercy Place, New York City.

1895.—Baldwin, James Fairchild, A.M., M.D., F.A.C.S. Surgeon to Grant Hospital, 125 South Grant Avenue. Residence, 405 E. Town Street, Columbus, Ohio.

1903.—Bandler, Samuel Wyllis, M.D., F.A.C.S. Instructor in Gynecology in the New York Post-Graduate Medical School and Hospital; Adjunct Gynecologist to the Beth Israel Hospital. 134 West Eighty-seventh Street, New York, N. Y.

1911.—Barrett, Channing W., M.D., F.A.C.S. Gynecologist, Chicago Polyclinic School and Hospital; Professor of Gynecology

and Clinical Gynecology, College of Physicians and Surgeons, Medical Department, University of Illinois; Attending Surgeon and Gynecologist, Marion Sims Sanitarium; Obstetrician, Cook County Hospital. 446 St. James Place, Chicago.

1913.—Baughman, Greer, M.D. Associate Professor of Obstetrics, Medical College of Virginia. Residence and Office, 26 North Laurel St., Richmond, Va.

1907.—Bell, John Norval, M.D., F.A.C.S. Adjunct Professor of Obstetrics and Gynecology at Detroit College of Medicine; Gynecologist to Harper Hospital Polyclinic. Residence, 418 Fourth Avenue; Office, 506 Washington Arcade, Detroit, Mich.

1914.—Bill, Arthur Holbrook, A.M., M.D. Associate Professor of Obstetrics, School of Medicine, Western Reserve University; Visiting Obstetrician to the Maternity Hospital of Cleveland; Visiting Obstetrician and Head of the Department, Cleveland City Hospital; Obstetrician in charge of Out-patient Obstetrical Department, Western Reserve University. Residence, 2083 East 96th St.; Office, 1021 Prospect Ave., Cleveland, O.

1900.—Bonifield, Charles Lybrand, M.D. Professor of Clinical Gynecology in the Medical College of Ohio; President of the Cincinnati Academy of Medicine, 1900; Gynecologist to the Good Samaritan, Christ's, and to Speer's Memorial Hospitals; formerly President of the Cincinnati Obstetrical Society; Secretary of the Section on Obstetrics and Gynecology, American Medical Association, 1901–4; Chairman, 1905; *Vice-president*, 1907. Residence, corner Washington and Gholson Avenues; Office, 409 Broadway, Cincinnati, Ohio.

1896.—Bosher, Lewis C., M.D., F.A.C.S. Professor of Practice of Surgery and Clinical Surgery, Medical College of Virginia; Visiting Surgeon, Memorial Hospital, Richmond. 422 East Franklin Street, Richmond, Va.

Founder.—Boyd, James Peter, A.M., M.D. Professor of Obstetrics and Diseases of Children in the Albany Medical College; Consulting Obstetrician and Gynecologist to the Albany Hospital; Fellow of the British Gynecological Society. Fellow of the Royal Society of Medicine. 152 Washington Avenue, Albany, N. Y.

1889.—Branham, Joseph H., M.D. Professor of Surgery in the Maryland Medical College; Surgeon to the Franklin Square Hospital. 2200 Eutaw Place, corner Ninth Avenue, Baltimore, Md.

1912.—Brown, George Van Amber, M.D. Gynecologist, Cystoscopist, German Polyclinic; Gynecologist, Providence Hospital. Residence, 55 Gladstone Ave.; Office, 919–922 J. Henry Smith Bldg., Cor. Griswold and State Sts., Detroit, Michigan.

1894.—Brown, John Young, M.D., F.A.C.S. Professor of Clinical Surgery in Saint Louis University; Chief Surgeon to St. John's Hospital; President of the Mississippi Valley Medical Association, 1898; *Vice-president*, 1905; *President*, 1906; *Executive Council*, 1907–8. Residence, 303 North Grand Avenue; Office, 612 Metropolitan Building, Saint Louis, Mo.

1914.—Brown, William Mortimer, M.D. Obstetrician to Rochester General Hospital. Residence, 1776 East Ave.; Office, 272 Alexander St., Rochester, N. Y.

1908.—Buteau, Samuel H., M.D., F.A.C.S. Former member of California State Board of Medical Examiners; formerly Visiting Surgeon to Almeda County Hospital. Residence, 1052 Telegraph Avenue; Office, 1155 Broadway, Oakland, Cal.

Founder.—Carstens, J. Henry, M.D., F.A.C.S. Professor Abdominal and Pelvic Surgery, Detroit College of Medicine and Surgery, President of the Faculty. Consulting Gynecologist to the Harper Hospital; Cons. Obstetrician to the Woman's Hospital; Consulting Obstetrician to the House of Providence; Ex-President Michigan State Medical Society; Ex-President Mississippi Valley Medical Society; Ex-Chairman Section of Obstetrics, A. M. A.; Member Royal Society of Medicine; Member American College of Surgeons; etc., etc. President of the Detroit Gynecological Society, 1892. *Vice-president*, 1888–89; *President*, 1895; *Executive Council*, 1896–98. 620 Woodward Avenue, Detroit, Mich.

1914.—Chandler, George, M.D., F.A.C.S. Surgeon to the Kingston City Hospital. Residence and Office, 11 East Chestnut St., Kingston, N. Y.

1904.—Congdon, Charles Ellsworth, M.D. Gynecologist to the City Hospital for Women. Office, 859 Humboldt Parkway, Buffalo, N. Y.

1901.—Crile, George W., A.M., M.D., F.A.C.S. Professor of Clinical Surgery in the Western Reserve University Medical College; Surgeon to St. Alexis's Hospital; Associate Surgeon to Lakeside Hospital. *Vice-president*, 1907. Residence, 6203 Euclid Avenue; Office, Osborn Building, Cleveland, Ohio.

1912.—Crotti, Andre, M.D., F.A.C.S. Professor of Clinical Surgery, Ohio State University; Surgeon to Grant Hospital, Children's Hospital and to St. Francis Hospital. Residence, 1728 E. Broad Street; Office, 151 E. Broad Street, Columbus, Ohio.

1905.—Crossen, Harry Sturgeon, M.D., F.A.C.S. Clinical Professor of Gynecology in Washington University; Gynecologist to Washington University Hospital; Associate Gynecologist to Mullanphy Hospital; Consulting Gynecologist to Bethesda, City and Female Hospitals. Residence, 4477 Delmar Avenue; Office, 310 Metropolitan Building, Saint Louis, Mo.

1912.—Darnall, William Edgar, A.B., M.D., F.A.C.S. Gynecologist, Atlantic City Hospital; Consulting Surgeon to North American Children's Sanitarium for the Treatment of Surgical Tuberculosis, and Home for Incurables, Longport, New Jersey. *Vice-president* American Medical Association, 1914. Residence and Office, 1704 Pacific Ave., Atlantic City, N. J.

1911.—Davis, Asa Barnes, M.D., F.A.C.S. Attending Surgeon of the Society of the Lying-in Hospital of the City of New York; Consulting Gynecologist to the Vassar Brother's Hospital, Poughkeepsie, N. Y. 42 E. 35th Street, New York.

1903.—Davis, John D. S., M.D., LL.D., F.A.C.S. Professor of Surgery in the Post-Graduate School of Medicine of the University of Alabama; Surgeon to Hillman Hospital; Surgeon to Davis Infirmary; ex-President Jefferson County Medical Society; *Vice-president*, 1905; *Vice-president*, 1909. 2031 Avenue G, Birmingham, Ala.

1896.—Deaver, John Blair, M.D., F.A.C.S. Professor of Clinical Surgery at the University of Pennsylvania; Surgeon in Chief to the German Hospital; Consulting Surgeon to the Germantown Hospital. 1634 Walnut Street, Philadelphia, Pa.

1910.—Dice, William Gordon, A.B., M.D. Obstetrician to Flower Hospital. 240 Michigan Street, Toledo, Ohio.

1909.—Dickinson, Gordon K., M.D., F.A.C.S. Surgeon to the City and Christ Hospitals; Consulting Surgeon to Bayonne Hospital. Consulting Surgeon, Stumpf Memorial Hospital, Kearny, N. J. 280 Montgomery Street, Jersey City, N. J.

1892.—Dorsett, Walter Blackburn, M.D., F.A.C.S. Professor of Gynecology and Pelvic Surgery, St. Louis University School of Medicine; Gynecologist to the Evangelical Deaconess

Hospital, Missouri Baptist Sanitarium and Rebeckah Hospital. Consulting Gynecologist to St. John's Hospital; Member of the Southern Surgical and Gynecological Society, Western Surgical Society, Southwestern Medical Association, St. Louis Surgical Society, St. Louis Surgical Club, Alumni Medical Society of the St. Louis City Hospital, St. Louis Academy of Science. President of the Missouri State Medical Society, 1892; President of the Missouri State Medical Association, 1900. Vice-president of the Western Surgical Society, 1912. Vice-president of the Southwestern Medical Association, 1913. Chairman of the Section on Obstetrics and Diseases of Women, American Medical Association, 1907. *Vice-president*, 1898; *President*, 1904; *Executive Council*, 1905–1907. Office, 409–412 Wall Building, St. Louis, Mo.

1899.—Eastman, Thomas Barker, A.B., M.D., F.A.C.S. Professor of the Medical and Surgical Diseases of Women, Central College of Physicians and Surgeons; Gynecologist to the City Hospital, City Dispensary, and Central Free Dispensary. 309 Pennway Building, Indianapolis, Ind.

1904.—Elbrecht, Oscar H., M.D., F.A.C.S. Visiting Surgeon to St. Louis City Hospital and Allied Institutions; Consulting Surgeon to Bethesda Hospital; Consulting Surgeon to St. Louis Maternity Hospital and Chief of Staff. Office, Nos. 423–25 Metropolitan Bldg., St. Louis, Mo.

1906.—Erdmann, John Frederick, M.D., F.A.C.S. Professor of Surgery, N. Y. Post-Graduate Hospital and Medical School; Attending Surgeon to Gouverneur Hospital and Post-Graduate Hospital; Consulting Surgeon to St. John's Riverside Hospital, Yonkers, N. Y.; Mt. Vernon General Hospital, Mt. Vernon, N. Y.; Greenwich General Hospital, Greenwich, Conn.; Nassau Hospital, Mineola, L. I. 60 West Fifty-second Street, New York, N. Y.

1911.—Findley, Palmer, B.E., M.D., F.A.C.S. Professor of Gynecology, College of Medicine, University of Nebraska. 418 Brandeis Theater Building, Omaha, Neb.

1910.—Foster, Curtis Smiley, A.B., M.D., F.A.C.S. Gynecologist to the Western Pennsylvania Hospital, Pittsburg. Residence, 5749 Ellsworth Avenue; Office, 308 Diamond Bank Building, Pittsburg, Pa.

1903.—Frank, Louis, M.D., F.A.C.S. Professor of Abdominal and Pelvic Surgery, Medical Department, University of Louisville;

Surgeon Louisville City Hospital; Surgeon to John N. Norton Memorial Infirmary; President Mississippi Valley Medical Association, 1912; *Executive Council*, 1913. Residence, 1321 Fourth Ave.; Office, 400 The Atherton, Louisville, Kentucky.

1913.—Freeland, James Roy, M.D., F.A.C.S. Obstetrician to Western Pennsylvania Hospital, Pittsburg, Pa. Residence and Office, 4715 Fifth Ave., Pittsburg, Pa.

1912.—Furniss, Henry Dawson, M.D., F.A.C.S. Adjunct Professor of Gynecology, New York Post-Graduate Hospital; Assistant Attending Gynecologist New York Post-Graduate Hospital; Assistant Attending Gynecologist New York Red Cross Hospital; Consulting Cystoscopist, New Rochelle Hospital; Fellow New York Academy of Medicine, New York Medico-Surgical Society, New York Obstetrical Society, New York State and County Medical Societies, American Medical Association, American Urological Society. Residence, 393 West End Ave.; Office, 375 West End Avenue, New York, N. Y.

1902.—Gillette, William J., M.D. Professor of Abdominal Surgery and Gynecology in the Toledo Medical College; Surgeon to Robinwood Hospital. 1613 Jefferson Street, Toledo, Ohio.

1895.—Goldspohn, Albert, M.S., M.D., F.A.C.S. Professor of Gynecology, Post-Graduate Medical School; Surgeon in Chief of Evangelical Deaconess Hospital. *Vice-president*, 1901. Residence, 2118, Office, 2120 Cleveland Avenue, Chicago, Ill.

1912.—Goodman, Sylvester Jacob, Ph.G., M.D. Surgeon and Obstetrician Grant Hospital; Lecturer of Obstetrics; Training School for Nurses, Grant Hospital; Consulting Surgeon, Actor's Fund of America, etc., etc. Residence and Office, 238 State Street, Columbus, Ohio.

1913.—Gray, Frank D., M.E.D., M.D., F.A.C.S. Visiting Surgeon to Christ and the City Hospitals, Jersey City; Consulting Surgeon to North Hudson Hospital, Weehawken State Hospital for Insane, Morris Planes, N. J.; State Village for Epileptics, Skillman, N. J.; First Vice-president New Jersey State Medical Society. Residence and Office, 62 Madison Ave., Jersey City, N. J.

1913.—Hadden, David, B.S., M.D., F.A.C.S. Residence, 2716 Telegraph Ave., Berkeley; Office, Oakland Bank of Savings Bldg., Oakland, Cal.

1900.—Haggard, William David, Jr., M.D., F.A.C.S. Professor of Gynecology, Medical Department University of Tennessee; Professor of Gynecology and Abdominal Surgery, University of the South (Sewanee); Gynecologist to the Nashville City Hospital; President of the Nashville Academy of Medicine; Secretary of the Section on Diseases of Women and Obstetrics, American Medical Association, 1898; Fellow (and Secretary) of the Southern Surgical and Gynecological Association; Member of the Alumni Association of the Woman's Hospital, N. Y. *Vice-president*, 1904. 148 Eighth Avenue, North, Nashville, Tenn.

1906.—Hall, Joseph Arda, M.D., F.A.C.S. Clinical Assistant in Gynecology at the Miami Medical College, Cincinnati. 628 Elm Street, Cincinnati, Ohio.

1889.—Hall, Rufus Bartlett, A.M., M.D., F.A.C.S. Professor of Clinical Gynecology in the Ohio-Miami Medical College, Medical Department of University of Cincinnati; Gynecologist to the Cincinnati Hospital; Surgeon in charge of the Hall Hospital; Member of the British Medical Society; of the Southern Surgical and Gynecological Association; of the American Medical Association; of the Ohio State Medical Society (President, 1900); of the Cincinnati Academy of Medicine (President, 1909); of the Cincinnati Obstetrical Society (Ex-President). *Vice-president*, 1891; *President*, 1900; *Executive Council*, 1904–1909. Berkshire Building, 628 Elm Street, Cincinnati, Ohio.

1902.—Hamilton, Charles Sumner, A.B., M.D., F.A.C.S Professor of the Principles of Surgery in Sterling Medical College; Surgeon to Mt. Carmel and the Children's Hospitals. 142 South Garfield Street, Columbus, Ohio.

1910.—Harrar, James Aitken, M.D., F.A.C.S. Attending Surgeon to the Lying-in Hospital of the City of New York. Residence and Office, 108 East 64th Street, New York, N. Y.

1894.—Hayd, Herman Emil, M.D., M.R.C.S. Eng., F.A.C.S. Surgeon to the German Deaconess Hospital; Surgeon to the German Hospital. *Vice-president*, 1903; *Executive Council*, 1908–1910; *President*, 1911. 493 Delaware Avenue, Buffalo, N. Y.

1908.—Hedges, Ellis W., A.B., M.D., F.A.C.S. Visiting Surgeon to Muhlenberg Hospital, Plainfield, N. J. 703 Watchung Avenue, Plainfield, N. J.

1910.—Hill, Isadore Leon, A.B., M.D. Clinical Instructor of Obstetrics at Cornell University Medical College; Visiting Obstetrician to the Red Cross Hospital; Attending Obstetrician to Sydenham Hospital. 616 Madison Avenue, New York, N. Y.

1891.—Howitt, Henry, M.D., M.R.C.S. Eng., F.A.C.S. Surgeon to the Guelph General and St. Joseph's Hospital, Guelph; Member of the British and Ontario Medical Associations; Medical Health Officer for the City of Guelph. Examiner in Obstetrics and Gynecology for the Ontario Medical Council 1892–1898. *Vice-president*, 1895. 221 Woolwich Street, Guelph, Ontario, Canada.

1905.—Huggins, Raleigh Russell, M.D., F.A.C.S. Surgeon to St. Francis Hospital. *Vice-president*, 1910. 1018 Westinghouse Building, Pittsburg, Pa.

1895.—Humiston, William Henry, M.D. Associate Professor of Gynecology in the Medical Department of Western Reserve University; Gynecologist in Chief to St. Vincent's Charity Hospital; Consulting Gynecologist to the City Hospital; President of the Ohio State Medical Society, 1898. *Executive Council*, 1902–1903, 1908, 1910–1911. *President*, 1909. Residence, 2041 East Eighty-ninth Street; Office, 536 Rose Building, Cleveland, Ohio.

1901.—Ill, Charles L., M.D., F.A.C.S. Surgeon to the German Hospital; Assistant Gynecologist to St. Michael's and St. Barnabas's Hospitals; Obstetrician to St. Barnabas's Hospital, Newark; Assistant Gynecologist to All Souls' Hospital, Morristown. 188 Clinton Avenue, Newark, N. J.

Founder.—Ill, Edward Joseph, M.D., F.A.C.S. Surgeon to the Woman's Hospital; Medical Director of St. Michael's Hospital; Gynecologist and Supervising Obstetrician to St. Barnabas's Hospital; Consulting Gynecologist to the German Hospital and the Bnoth Israel Hospital of Newark, N. J., to All Souls' Hospital, Morristown, N. J., and to the Mountain Side Hospital, Montclair, N. J.; Member of the Southern Surgical and Gynecological Association; Vice-president from New Jersey of the Pan-American Medical Congress of 1893; President of the Medical Society of the State of New Jersey, 1907. *Vice-president*, 1893; *President*, 1899; *Executive Council*, 1901–1903. 1002 Broad Street, Newark, N. J.

1909.—Jacobson, Julius H., M.D., F.A.C.S. Professor of Gynecology and Clinical Surgery, Medical Department Toledo Univer-

sity; Surgeon to Lucas City Hospital; Gynecologist to St. Vincent's Hospital, Toledo. 2050 Franklin Street, Toledo, O.

1910.—Jenks, Nathan, B.S., M.D., F.A.C.S. Lecturer on Obstetrics at the Detroit College of Medicine; Visiting Physician to the Woman's Hospital and Infant's Home; Visiting Obstetrician to the New Providence Hospital, Detroit. Residence, 231 Burns Street; Office, David Whitney Building, Detroit, Mich.

1906.—Jonas, Ernst, M.D., F.A.C.S. Clinical Professor of Surgery in Washington University Medical School; Surgeon in Charge of the Surgical Clinic at the Washington University Hospital; Gynecologist to the St. Louis Jewish Hospital; Visiting Surgeon to St. Louis City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Martha Parsons Free Hospital for Children. Residence, 4495 Westminster Place; Office, 465 North Taylor Avenue, St. Louis, Mo.

1910.—Jones, Arthur Thomas, M.D., F.A.C.S. Visiting Gynecologist to St. Joseph's Hospital, Providence; Visiting Surgeon to Memorial Hospital, Pawtucket, R. I.; Visiting Surgeon to Rhode Island State Hospital for the Insane, Howard, R. I.; Consulting Surgeon to Woonsocket Hospital, Woonsocket, R. I. 81 Elm Grove Avenue, Providence, R. I.

1902.—Keefe, John William, M.D., F.A.C.S. Attending Surgeon to the Gynecological Department of St. Joseph's Hospital; Attending Surgeon to the Rhode Island Hospital; Consulting Surgeon to the Providence Lying-in Hospital. *Vice-president*, 1908. *Executive Council*, 1911. 259 Benefit Street, Providence, R. I.

1910.—Kennedy, James W., M.D., F A.C.S. Associate Gynecologist and Obstetrician to the Philadelphia Dispensary. 1409 Spruce Street, Philadelphia, Pa.

1911.—King, James E., M.D., F.A.C.S. Professor of Clinical Gynecology, Medical Department, University of Buffalo, New York; Attending Gynecologist, Buffalo General and Erie County Hospital and Good Samaritan Dispensary; Fellow Royal Society of Medicine, London, England. 1248 Main Street, Buffalo, N. Y.

1908.—Kirchner, Walter C. G., A.B., M.D., F.A.C.S. Formerly Superintendent and Surgeon in charge of the St. Louis City Hospital. Visiting Surgeon City Hospital, Consulting Surgeon St. John's Hospital. Office, Metropolitan Building, St. Louis, Mo.

1898.—Langfitt, William Sterling, M.D., F.A.C.S. Surgeon in chief to St. John's Hospital. Office, 8047 Jenkins Building, Pittsburg, Pa.

1914.—Leighton, Jr., Adam P., L.M., M.D. Assistant in Gynecology, Medical School of Maine; Bowden College; Supt. and owner, Dr. Leighton's Maternity Hospital, Portland. Residence and Office, 192 State St., Portland, Me.

1910.—Lobenstine, Ralph Waldo, A.B., M.D., F.A.C.S. Attending Surgeon to the Lying-in Hospital of the City of New York; Gynecologist to Bellevue Hospital Dispensary. Residence, 780 Madison Avenue; Office, 162 East Seventy-first Street, New York, N. Y.

1890.—Longyear, Howard Williams, M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Detroit Post-Graduate Medical School; Clinical Professor of Gynecology in the Detroit College of Medicine; Gynecologist to Harper Hospital; Physician to the Woman's Hospital; President of the Detroit Gynecological Society, 1889; Chairman of the Section on Obstetrics and Gynecology of the Michigan State Medical Society, 1892. *Vice-president*, 1893; *President*, 1905; *Executive Council*, 1906–1908. 271 Woodward Avenue, Detroit, Mich.

1911.—Lothrop, Earl P., A.B., M.D., F.A.C.S. Gynecologist to the Buffalo Woman's Hospital; Consulting Surgeon to Columbus Hospital, Buffalo; Surgeon to the J. N. Adam Memorial Hospital for Tuberculosis, Perrysburg, N. Y. 153 Delaware Avenue, Buffalo, N. Y.

1910.—Lott, Henry Stokes, M.D. 123 Cherry Street, Winston, N. C.

1913.—Lynch, Jerome Morley, M.D., F.A.C.S. Professor Rectal and Intestinal Diseases, New York Polyclinic; Consulting Surgeon Nassau Hospital, Mineola, L. I.; Attending Surgeon St. Mary's Hospital, Hoboken, N. J.; Member New York State and County Societies, American Medical Association, American Proctologic Society, North Western Medical and Surgical Society; Surgeon Medical Reserve, U. S. N. Residence and Office, 57 East Fifty-second St., New York City.

1896.—Lyons, John Alexander, M.D., F.A.C.S. Instructor in Gynecology at the Post-Graduate Medical School; Gynecologist

and Lecturer to Nurses at the Chicago Hospital. Residence, 6848 Anthony Avenue; Office, 4118 State Street, Chicago, Ill.

1910.—McClellan, Benjamin Bush, A.B., M.D., F.A.C.S. Member American Medical Association; ex-President Ohio State Medical Society; Surgeon to McClellan Hospital. Residence, 636 South Detroit Street; Office, 7 East Second Street, Xenia, Ohio.

Founder.—McMurtry, Lewis Samuel, A.M., M.D., LL.D., F.A.C.S. Professor of Gynecology in the Hospital College of Medicine; Gynecologist to Sts. Mary and Elizabeth Hospital; Fellow of the Edinburgh Obstetrical Society; Fellow of the British Gynecological Society; Corresponding Member of the Obstetrical Society of Philadelphia and of the Gynecological Society of Boston; Member (President, 1891) of the Southern Surgical and Gynecological Association; President American Medical Association, 1905. *Executive Council*, 1891–1892, 1895–1905; *President*, 1893. Suite 542, The Atherton, Louisville, Ky.

1910.—McPherson, Ross, A.B., M.D. Attending Surgeon to the Lying-in Hospital of the City of New York. Residence, 26 Grammercy Park, East; Office, 20 West Fiftieth Street, New York, N. Y.

Founder.—Manton, Walter Porter, M.D., F.A.C.S. Professor of Obstetrics and Clinical Gynecology, Detroit College of Medicine and Surgery; Gynecologist to Harper Hospital and the Pontiac and Traverse City State Hospitals; Consulting Gynecologist to St. Joseph's Retreat; President of the Medical Board and Visiting Obstetrician Woman's Hospital and Infants' Home; President Detroit Academy of Medicine, 1892–1894; President Detroit Gynecological Society, 1890; President Wayne County Medical Society, 1908–1909; Chairman, Section on Obstetrics and Diseases of Women, 1909; Fellow of the Royal Medical Society, the American Gynecological Society, the American College of Surgeons; the Zoological Society of London, etc. *Vice-president*, 1894. 32 Adams Avenue, W., Detroit, Mich.

1911.—Marvel, Emery, M.D., F.A.C.S. Chief Surgeon and Gynecologist, Private Hospital Association's Atlantic City Consulting Surgeon and Gynecologist, Jewish Seashore Home, Atlantic City, 1801 Pacific Avenue, Atlantic City, N. J.

1914.—Meeker, Harold Denman, A.B., M.D. Adjunct Professor of Surgery, Polyclinic Medical School and Hospital, New

York; Visiting Surgeon to New York Red Cross Hospital. Residence and Office, 220 West 79th Street, New York, N. Y.

Founder.—Miller, Aaron Benjamin, M.D., F.A.C.S. Professor of Gynecology in the Medical Department of Syracuse University; Gynecologist to St. Joseph's Hospital, House of the Good Shepherd and Dispensary. *Vice-president*, 1899, 1904; *President*, 1910; *Executive Council*, 1911. 326 Montgomery Street, Syracuse, N. Y.

1905.—Miller, John D., M.D., F.A.C.S. Assistant to the Chair of Clinical Gynecology in the Medical College of Ohio, University of Cincinnati; Gynecologist to the Good Samaritan Hospital. N. E. Corner Clifton Avenue and W. McMillan Street, Cincinnati, Ohio.

1911.—Moots, Charles W., B.S., M.D., F.A.C.S. Gynecologist to Flower Hospital; President of Academy of Medicine of Toledo and Lucas County, 1912. Residence, River Road, R.F.D. No. 4; Office, 347 The Nicholas, Toledo, O.

1907.—Moriarta, Douglas C., M.D., F.A.C.S. Senior Surgeon to Saratoga Hospital; Surgeon in chief to Saint Christian Hospital for Children; Director of State Experimental Station at Saratoga. 511 Broadway, Saratoga Springs, N. Y.

1904.—Morris, Lewis Coleman, M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Birmingham Medical College; Secretary, Medical Association State of Alabama, 1904; Member of Jefferson County Board of Health. *Vice-president*, 1911. 1203 Empire Building, Birmingham, Ala.

1890.—Morris, Robert Tuttle, A.M., M.D., F.A.C.S. Professor of Surgery in the New York Post-Graduate Medical School and Hospital. *Vice-president*, 1892; *Executive Council*, 1906, 1908–1911; *President*, 1907. 616 Madison Avenue, New York, N. Y.

1894.—Murphy, John Benjamin, A.M., M.D., LL.D., F.R.C.S. (Eng.), F.A.C.S. Professor of Surgery and Head of the Department Northwestern University; Chief Surgeon to Mercy Hospital and St. Joseph's Hospital; Attending Surgeon to Columbus, Alexian Brothers and Cook County Hospitals; President of the American Medical Association, 1911. Residence, 3305 Michigan Avenue; Office, 800 Monroe Building, 104 S. Michigan Avenue, Chicago, Ill.

1896.—Noble, George Henry, M.D. F.A.C.S. Gynecologist to the Grady Hospital; Secretary to the Section on Obstetrics and

Gynecology of American Medical Association, 1897; Member of the Southern Surgical and Gynecological Association. 186 South Pryor Street, Atlanta, Ga.

1903.—Noble, Thomas Benjamin, M.D. Professor of Abdominal Surgery in the Central College of Physicians and Surgeons; Consultant in the Diseases of Women at the City Hospital, City Dispensary, and Protestant Deaconess's Hospital, Indianapolis. 427 Newton Claypool Building, Indianapolis, Ind.

1907.—Olmsted, Ingersoll, M.D., F.A.C.S. Surgeon to the City and St. Joseph's Hospitals, Hamilton, Ont. 215 South James St., Hamilton, Ontario, Canada.

1899.—Pantzer, Hugo Otto, M.D., F.A.C.S. Professor of Clinical Gynecology in the Indiana Medical College, Medical Department of Purdue University; Gynecologist to City Hospital, City Dispensary, St. Vincent's and Deaconess's Hospitals; Member of Indianapolis, Indiana State, Ohio Valley, Mississippi Valley, Medical Associations and Indianapolis Gynecological Association. *Executive Council*, 1907–1911. 601 Hume-Mansar Bldg., Indianapolis, Ind.

1899.—Pfaff, Orange G., M.D. Adjunct Professor of Obstetrics and Diseases of Women in the Medical College of Indiana; Gynecologist to the City, Deaconess's, and St. Vincent's Hospitals. 1337 North Pennsylvania Street, Indianapolis, Ind.

1898.—Porter, Miles F., M.D., F.A.C.S. Surgeon to Hope Hospital; Professor of Surgery in the Indiana University School of Medicine; ex-President Indiana State Medical Society. *Vice-president*, 1902; *President*, 1912–1913. 207 West Wayne Street, Fort Wayne, Ind.

1914.—Potter, Irving White, M.D. Attending Obstetrician, St. Mary's Maternity Hospital, Assistant Obstetrician, Buffalo General Hospital. Residence and Office, 420 Franklin St., Buffalo, N. Y.

1903.—Poucher, John Wilson, M.D., F.A.C.S. Consulting Surgeon to Vassar Brothers Hospital, Poughkeepsie. 339 Mill Street, Poughkeepsie, N. Y.

1904.—Reder, Francis, M.D., F.A.C.S. Surgeon to Missouri Baptist Sanitarium; Surgeon to St. John's Hospital; Visiting Surgeon to St. Louis City Hospital, and allied Institutions. Resi-

dence, 6346 Berlin Avenue; Office, 518–519 Delmar Building, St. Louis, Mo.

Founder.—Reed, Charles Alfred Lee, A.M., M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery and in the Woman's Medical College of Cincinnati; Surgeon to the Cincinnati Free Surgical Hospital for Women; Secretary-General of the First Pan-American Medical Congress, 1893; Member of the Southern Surgical and Gynecological Association; Fellow of the British Gynecological Society; President of the American Medical Association, 1901. *Executive Council*, 1890–1897; *President*, 1898. Rooms 60 and 62, The Groton, N. E. corner Seventh and Race Streets, Cincinnati, Ohio.

1913.—Rongy, Abraham Jacob, M.D., F.A.C.S. Attending Gynecologist, Lebanon Hospital; Attending Surgeon, Jewish Maternity Hospital; Consulting Gynecologist, Rockaway Beach Hospital. Residence and Office, 154 Henry Street, New York City.

1909.—Rosenthal, Maurice I., M.D., F.A.C.S. Surgeon to Saint Joseph's Hospital. 336 W. Berry Street, Fort Wayne, Ind.

1902.—Runyan, Joseph Phineas, M.D. Division Surgeon to the Choctaw, Oklahoma and Gulf Railroad; Secretary of the Arkansas State Medical Association, President, 1904. 1514 Schiller Avenue, Little Rock, Ark.

1906.—Ruth, Charles Edward, M.D., F.A.C.S. Professor of Surgery and Clinical Surgery in the Keokuk Medical College (College of Physicians and Surgeons); Surgeon to the Chicago and Rock Island Pacific Railway. Des Moines, Iowa.

1903.—Sadlier, James Edgar, M.D., F.A.C.S. Consulting Surgeon to Highland Hospital, Poughkeepsie. *Vice-president*, 1909. 295 Mill Street, Poughkeepsie, N. Y.

1909.—Sanes, K. Isadore, M.D., F.A.C.S. Gynecologist to the West Penn Hospital; Consulting Gynecologist to the Montefiore Hospital, Pittsburg. Residence, 234 McKee Place; Office, Jenkins Building, Pittsburg, Pa.

1910.—Schildecker, Charles Bushfield, M.D. Assistant Gynecologist to Western Pennsylvania Hospital; Coroner's Physician of Allegheny County. Residence, 414 Rebecca Street; Office, 1105 Park Building, Pittsburg, Pa.

1904.—Schwarz, Henry, M.D., F.A.C.S. Professor of Obstetrics, Medical Department of Washington University. *Vice-president*, 1911. 440 North Newstead Avenue, St. Louis, Mo.

1901.—Scott, N. Stone, A.M., M.D. Professor of Surgery, College of Physicians and Surgeons, Cleveland; Consulting Surgeon to City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Out-patient Department of Cleveland General Hospital. Residence, 531 Prospect Avenue; Office, 603–604 Citizens' Building, Cleveland, Ohio.

1895.—Sellman, William Alfred Belt, M.D. Gynecologist to The Biedler and Sellman Sanitarium; Member of the Medical and Chirurgical Faculty of Maryland; also of the Baltimore City Medical Society; also of the American Medical Association; the Gynecological and Obstetrical Association of Baltimore; Physician to The Margaret J. Bennett Home for Young Ladies. *Vice-president*, 1908; *Executive Council*, 1909–1910. 5 East Biddle Street, Baltimore, Maryland.

1908.—Sherrill, Joseph Garland, A.M., M.D., F.A.C.S. Professor of Surgery and Clinical Surgery at the University of Louisville. Office, Suite 542, The Atherton, Louisville, Ky.

1899.—Simpson, Frank Farrow, A.B., M.D., F.A.C.S. Gynecologist to the Allegheny General Hospital; Consulting Gynecologist to the Columbia Hospital. *Vice-president*, 1906. Jenkins Building, Pittsburg, Pa.

1912.—Skeel, Arthur Julius, M.D., F.A.C.S. Assistant Professor of Obstetrics, Western Reserve University; Obstetrician to City Hospital; Associate Obstetrician to St. Luke's Hospital; Consulting Obstetrician to the Florence Crittenden Home; Consulting Obstetrician to the Woman's Hospital. Residence and Office, 1834 East 65th Street, Cleveland, Ohio.

1901.—Skeel, Roland Edward, M.D., F.A.C.S. Associate Clinical Professor of Gynecology in Western Reserve University; Gynecologist to St. Luke's, City, and Lutheran Hospitals; Consulting Surgeon to the Lakewood Hospital. 314 Osborn Building, Cleveland, O.

1910.—Smead, Lewis Frederic, A.B., M.D., F.A.C.S. Surgeon to St. Vincent's Hospital, Toledo. Residence, 2921 Parkwood Avenue; Office, 242 Michigan Street, Toledo, Ohio.

1891.—Smith, Charles North, M.D., F.A.C.S. Surgical Chief of Flower Hospital; Gynecologist to St. Vincent's Hospital; *Vice-president*, 1910. 234 Michigan Street, Toledo, Ohio.

1913.—Smith, Lewis Watson, A.B., M.D. Assistant Gynecologist, Allegheny General Hospital; Gynecologist, Pittsburg Free Dispensary. Residence and Office, 6024 Station St., Pittsburg, Pa.

1904.—Smith, William S., M.D. Professor of Gynecology in the Maryland Medical College; Gynecologist to Franklin Square Hospital. 528 Hanover Street, Baltimore, Md.

1902.—Stark, Sigmar, M.D., F.A.C.S. Professor of Obstetrics and Clinical Gynecology in the Cincinnati College of Medicine and Surgery; Gynecologist to the Jewish Hospital. 1108 East McMillan Street, Cincinnati, Ohio.

1908.—Stewart, Douglas Hunt, M.D., F.A.C.S. Residence, 128 West 6th Street, New York, N. Y.

1911.—Stillwagen, Charles A., M.D., F.A.C.S. 524 Pennsylvania Avenue, Pittsburg, Pa.

1914.—Strasser, August Adrian, M.D., F.A.C.S. President of the Hudson Co. Medical Society; Assistant Surgeon of the Woman's Hospital, St. Michael's Hospital, Newark, N. J.; Associate Fellow New York Academy of Medicine; Surgeon Stumpf Memorial Hospital, Kearny, N. J. Residence and Office, 115 Beech St., Arlington, Hudson Co., N. J.

1904.—Sutcliffe, John Asbury, A.M., M.D. Professor of Genitourinary Surgery; Indiana School of Medicine; Consulting Surgeon to St. Vincent's Infirmary; Consultant in Genitourinary Diseases to the City Hospital and to the Protestant Deaconess's Hospital. Residence, 1121 Central Avenue; Office, 155 East Market Street, Indianapolis, Ind.

1899.—Swope, Lorenzo W., M.D., F.A.C.S. Surgeon to the Consolidated Traction Company; Chief Surgeon to Wabash Railroad, Pittsburg Division; Surgeon to Western Pennsylvania Hospital; Surgeon to Passavant Hospital; Member of the Allegheny County Medical Society; Member of the American Medical Association. Residence, 4629 Bayard Street; Office, 1105 Park Building, Pittsburg, Pa.

1901.—Tate, Magnus Alfred, M.D., F.A.C.S. Professor of Obstetrics Miami Medical College; President Cincinnati Academy of Medicine, 1905. 19 West Seventh Street, Cincinnati, Ohio.

1908.—Torrance, Gaston, M.D. Surgeon to St. Vincent's and the Hillman Hospitals in Birmingham. Residence, 1626 Eleventh Avenue, South; Office, 325 Woodward Building, Birmingham, Ala.

1907.—Vance, Ap Morgan, M.D., F.A.C.S. Surgeon to Kentucky Masonic Widow's and Orphan's Home and Infirmary; Surgeon to Sts. Mary and Elizabeth Hospital, Louisville. 835 South Fourth Avenue, Louisville, Ky.

Founder.—Vander Veer, Albert, A.M., M.D., Ph.D., LL.D., F.A.C.S. Professor of Surgery, Albany Medical College; Surgeon-in-Chief, Albany Hospital; Consulting Surgeon, South End Dispensary; Consulting Surgeon, Benedictine Hospital, Kingston, N. Y.; Consulting Surgeon, Champlain Valley Hospital, Plattsburgh, N. Y.; Fellow of the American Surgical Association (President, 1906); Fellow of the British Gynecological Society; Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Boston Gynecological Society. *Executive Council*, 1889–1891, 1895–1905; *President*, 1892. 28 Eagle Street, Albany, N. Y.

1913.—Vander Veer, Edgar Albert, Ph. D., M.D., F.A.C.S. Professor of Abdominal and Clinical Surgery, Albany Medical College; Attending Surgeon, Albany Hospital. Residence, 150 State Street; Office, 28 Eagle Street, Albany, N. Y.

1912.—Van Sweringen, Budd, M.D. 208 Washington Boulevard, Fort Wayne, Indiana.

1909.—Wade, Henry Albert, M.D., F.A.C.S. Visiting Surgeon to Bethany Deaconess's Hospital; Attending Gynecologist to Williamsburg Hospital, Brooklyn. 495 Greene Avenue, Brooklyn, N. Y.

1909.—Waldo, Ralph, M.D., F.A.C.S. Gynecologist to Lebanon Hospital; Associate Surgeon to the Woman's Hospital of the State of New York. 54 W. 71st Street, New York, N. Y.

1891.—Walker, Edwin, M.D., Ph.D., F.A.C.S. Gynecologist to the Evansville City Hospital; President of the Indiana State Medical Society, 1892; Member of the American Medical Association and of the Mississippi Valley Medical Association; Member of the Southern Surgical and Gynecological Association; First Vice-

president American Medical Association, 1907. *Vice-president*, 1901. 712 South Fourth Street, Evansville, Ind.

1907.—Weiss, Edward Aloysius, M.D., F.A.C.S. Gynecologist to Mercy Hospital; Gynecologist to Presbyterian Hospital; Obstetrician to Rosalia Maternity Hospital; Assistant Professor of Gynecology at University of Pittsburg, Medical Department. 714 Jenkins Building, Pittsburg, Pa.

1914.—Welton, Thurston Scott, M.D. Associate Visiting Gynecologist, Williamsburgh Hospital, Brooklyn; Residence and Office, 842 Union Street, Brooklyn, N. Y.

Founder.—Werder, Xavier Oswald, M.D., F.A.C.S. Professor of Gynecology at the University of Pittsburg, Medical Department; Gynecologist to Mercy Hospital. *Treasurer*, 1888–1911. *President*, 1911. 714 Jenkins Building, Pittsburg, Pa.

1904.—West, James Nephew, M.D., F.A.C.S. Professor of Diseases of Women and Secretary of the Faculty at the New York Post-Graduate Medical School and Hospital. *Vice-president*, 1906. 71 West Forty-ninth Street, New York.

1896.—Westmoreland, Willis Foreman, M.D., F.A.C.S. Professor of Surgery at the Atlanta Medical College. Suite 241, Equitable Building, Atlanta, Ga.

1911.—White, George R., B.S., M.D., F.A.C.S. Surgeon Park View Sanitarium. 2 Liberty E., Savannah, Ga.

1909.—Yates, H. Wellington, M.D., F.A.C.S. Gynecologist to St. Mary's Hospital; Gynecologist to Providence Hospital; Assistant Professor of Gynecology, Detroit College of Medicine and Surgery; Member of the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association; Member of the Staff of St. Luke's Hospital; Member of the Wayne County and Michigan State Medical Society; President Detroit Medical Club; Medical Director of the Peninsular Life Insurance Co. Residence, 1360 Fort Street, West; Office, 607 Gas Office Building, Detroit, Mich.

1907.—Ziegler, Charles Edward, A.M., M.D., F.A.C.S. Professor of Obstetrics in the University of Pittsburg; Medical Director of the Elizabeth Steele Magee Hospital for Women; Medical Director of the Pittsburg Maternity Dispensary; Consulting Obstet-

rician to the Columbia Hospital and Consulting Obstetrician and Gynecologist to the Dixmont Hospital for the Insane. Forbes and Halket Streets, Pittsburg, Pa.

1900.—ZINKE, ERNST GUSTAV, M.D., F.A.C.S. Professor of Obstetrics and Clinical Midwifery in the Ohio-Miami Medical College, University of Cincinnati, Honorary Chief of Staff and Obstetrician and Gynecologist to the German Hospital; Obstetrician to the Maternity Hospital; President of Cincinnati Obstetric Society, 1887; President Academy of Medicine of Cincinnati, 1894; First Vice-president Ohio State Medical Society; Member and Chairman of Section on Obstetrics, Gynecology and Abdominal Surgery, of American Medical Association, 1914; Fellow of Southern Surgical and Gynecological Association. Honorary Member Jackson County Medical Society, Kansas City, Mo. *President*, 1908; *Executive Council*, 1909–1911. *Secretary*, 4 Seventh Avenue, West, Cincinnati, Ohio.

Total, one hundred and thirty-seven Ordinary Fellows.

ORDINARY FELLOWS, DECEASED.

1890.—Asdale, William James, M.D., Beaver Falls, Pa., 1912.

Founder.—Baker, Washington Hopkins, M.D., Philadelphia, Pa., 1904.

1889.—Burns, Bernard, M.D., Allegheny, Pa., 1892.

1890.—Coles, Walter, M.D., St. Louis, Mo., 1892.

1889.—Davis, William Elias B., M.D., Birmingham, Ala., 1903.

1892.—Duff, John Milton, A.M., M.D., Ph.D., Pittsburg, Pa., 1904.

1898.—Dunn, James C., M.D., Pittsburg, Pa., 1907.

1892.—Dunning, Lehman Herbert, M.D., Indianapolis, Ind., 1906.

1895.—Ferguson, Alexander Hugh, M.D., Chicago, Ill., 1911.

1890.—Frederick, Carlton Cassius, B.S., M.D., Buffalo, N.Y., 1911.

1891.—Gibbons, Henry, Jr., A.M., M.D., San Francisco, Cal., 1912.

1904.—Goodfellow, George E., M.D., Los Angeles, Cal., 1910.

1892.—Haggard, William David, Jr., M.D., Nashville, Tenn., 1901.

Founder.—Hill, Hampton Eugene, M.D., Saco, Me., 1894.

1912.—Hotaling, Albert Steuben, M.D., Syracuse, N. Y., 1913.

1898.—Hyde, Joel W., M.D., Brooklyn, N. Y., 1907.

1897.—Ingraham, Henry Downer, M.D., Buffalo, N. Y., 1904.

Founder.—Jarvis, George Cyprian, M.D., Hartford, Conn., 1900.

1892.—Jelks, James Thomas, M.D., Hot Springs, Ark., 1902.

1900.—Linville, Montgomery, A.B., M.D., New Castle, Pa., 1910.

Founder.—Lothrop, Thomas, M.D., Buffalo, N. Y., 1902.

1891.—McCann, James, M.D., Pittsburg, Pa., 1893.

1898.—McCann, Thomas, M.D., Pittsburg, Pa., 1903.

1896.—Mooney, Fletcher D., M.D., St. Louis, Mo., 1897.

Founder.—Potter, William Warren, M.D., Buffalo, N. Y., 1911.

Founder.—Price, Joseph, M.D., Philadelphia, Pa., 1911.

1896.—Rhett, Robert Barnwell, Jr., M.D., Charleston, S. C., 1901.

1889.—Rohe, George Henry, M.D., Baltimore, Md., 1899.

1892.—Rosenwasser, Marcus, M.D., Cleveland, O., 1910.

1890.—Ross, James Frederick Wm., M.D., C.M., L.R.C.P., Toronto, Ontario, Canada, 1911.

1889.—Seymour, William Wotkyns, A.B., M.D., Troy, N. Y., 1904.

1902.—Simons, Manning, M.D., Charleston, S. C., 1911.

Founder.—Townsend, Franklin, A.M., M.D., Albany, N. Y., 1895.

ORDINARY FELLOWS.

Classified.

ALABAMA.

Davis, John D. S.,	2031 Avenue G.,	Birmingham.
Morris, Lewis Coleman,	1203 Empire Bldg.,	Birmingham.
Torrance, Gaston,	325 Woodward Bldg.,	Birmingham.

ARKANSAS.

Runyan, Joseph Phineas,	1514 Schiller Ave.,	Little Rock.

CALIFORNIA.

Buteau, Samuel H.,	1155 Broadway,	Oakland.
Hadden, David,	Oakland Bank of Savings Bldg.,	Oakland.

CANADA.

Howitt, Henry,	221 Woolwich Street,	Guelph, Ontario.
Olmsted, Ingersoll,	215 South James St.,	Hamilton, Ontario.

GEORGIA.

Noble, George Henry,	186 South Pryor Street,	Atlanta.
Westmoreland, W. F.,	241 Equitable Bldg.,	Atlanta.
Whitem, George R.,	2 Liberty E.,	Savannah.

ILLINOIS.

Bacon, Joseph Barnes,		Macomb.
Barrett, Channing,	446 St. James Place,	Chicago.
Goldspohn, Albert,	34 Washington St.,	Chicago.
Lyons, John A.,	4118 State Street,	Chicago.
Murphy, John B.,	400 Reliance Bldg.,	Chicago.

INDIANA.

Walker, Edwin,	712 South Fourth St.,	Evansville.
Porter, Miles F.,	207 West Wayne St.,	Fort Wayne.
Rosenthal, M. I.,	336 West Berry St.,	Fort Wayne.
Van Sweringen, Budd,	208 Washington Blvd.,	Fort Wayne.
Eastman, Thomas B.,	309 Pennway Bldg.,	Indianapolis.
Noble, Thomas B.,	427 Newton Claypool Bldg.,	Indianapolis.
Pantzer, Hugo O.,	224 North Meridian St.,	Indianapolis.
Pfaff, O. G.,	1337 North Pennsylvania St.,	Indianapolis.
Sutcliffe, John A.,	155 East Market St.,	Indianapolis.

IOWA.

Ruth, Charles E.,	407 Equitable Bldg.,	Des Moines.

KENTUCKY.

Frank, Louis,	The Atherton,	Louisville.
McMurtry, Lewis S.,	The Atherton,	Louisville.
Sherrill, Joseph G.,	The Atherton,	Louisville.
Vance, Ap Morgan,	835 South Fourth Ave.,	Louisville.

MAINE.

Leighton, Adam P.,	192 State St.,	Portland.

MARYLAND.

Branham, Joseph H.,	2200 Eutaw Place,	Baltimore.
Sellman, William A. B.,	5 East Biddle St.,	Baltimore.
Smith, William S.,	528 Hanover St.,	Baltimore.

MICHIGAN.

Abrams, Edward Thomas,		Dollar Bay.
Bell, John Norval,	506 Washington Arcade,	Detroit.
Brown, Geo. Van Amber,	32 Adams Ave., West,	Detroit.
Carstens, J. Henry,	620 Woodward Ave.,	Detroit.
Jenks, Nathan,	271 Woodward Ave.,	Detroit.
Longyear, H. W.,	271 Woodward Ave.,	Detroit.
Manton, Walter P.,	32 Adams Ave., West,	Detroit.
Yates, H. Wellington,	1360 Fort Street,	Detroit.

MISSOURI.

Brown, John Young,	612 Metropolitan Bldg.,	Saint Louis.
Crossen, H. S.,	Metropolitan Bldg.,	Saint Louis.
Dorsett, Walter B.,	Linmar Bldg.,	Saint Louis.
Elbrecht, Oscar H.,	Metropolitan Bldg.,	Saint Louis.
Jonas, Ernst,	465 North Taylor Ave.,	Saint Louis.
Kirchner, Walter C. G.,	Metropolitan Bldg.,	Saint Louis.
Reder, Francis,	6346 Berlin Ave.,	Saint Louis.
Schwarz, Henry,	440 North Newstead Ave.,	Saint Louis.

NEBRASKA.

Findley, Palmer,	418 Brandeis Theater Bldg.,	Omaha.

NEW JERSEY.

Strasser, August A.,	115 Beech St.,	Arlington.
Darnall, Wm. Edgar,	1704 Pacific Ave.,	Atlantic City.
Marvel, Emery,	1801 Pacific Ave.,	Atlantic City.
Dickinson, Gordon K.,	280 Montgomery St.,	Jersey City.
Gray, Frank D.,	62 Madison Ave.,	Jersey City.
Ill, Charles L.,	188 Clinton Ave.,	Newark.
Ill, Edward J.,	1002 Broad St.,	Newark.
Hedges, Ellis W.,	703 Watchung Ave.,	Plainfield.

NEW YORK.

Boyd, James P.,	152 Washington Ave.,	Albany.
Vander Veer, Albert,	28 Eagle Street,	Albany.
Vander Veer, Edgar A.,	150 State St.,	Albany.
Wade, Henry A.,	495 Greene Ave.,	Brooklyn.
Welton, T. Scott,	842 Union St.,	Brooklyn.
Congdon, Chas. E.,	859 Humboldt Parkway,	Buffalo.
Hayd, H. E.,	493 Delaware Ave.,	Buffalo.
King, James E.,	1248 Main St.,	Buffalo.
Lothrop, Earl P.,	153 Delaware Ave.,	Buffalo.
Potter, Irving W.,	420 Franklin St.,	Buffalo.
Chandler, George,	11 East Chestnut St.,	Kingston.
Bainbridge, W. S.,	34 Grammercy Place,	New York.
Bandler, S. W.,	134 West Eighty-seventh St.,	New York.
Davis, Asa B.,	42 East 35th St.,	New York.
Erdmann, John F.,	60 West Fifty-Second St.,	New York.
Furniss, Harry Dawson,	393 West End Ave.,	New York.
Harrar, James A.,	29 East Seventy-seventh St.,	New York.
Hill, I. L.,	616 Madison Ave.,	New York.
Lynch, Jerome Morley,	57 East 52nd St.,	New York.
Lobenstine, R. W.,	155 East Seventieth St.,	New York.
McPherson, Ross A.,	20 West Fiftieth St.,	New York.
Meeker, Harold D.,	220 West 79th St.,	New York.
Morris, R. T.,	616 Madison Ave.,	New York.
Rongy, Abraham J.,	154 Henry St.,	New York.
Stewart, Douglas H.,	128 West 86th St.,	New York.
Waldo, Ralph,	54 West 71st St.,	New York.
West, James N.,	71 West Forty-ninth St.,	New York.
Moriarta, Douglas C.,	511 Broadway,	Saratoga Springs.
Sadlier, James E.,	295 Mill St.,	Poughkeepsie.
Poucher, John W.,	339 Mill St.,	Poughkeepsie.
Miller, A. B.,	326 Montgomery St.,	Syracuse.

NORTH CAROLINA.

Lott, Henry Stokes,	123 Cherry St.,	Winston.

OHIO.

Bonifield, Chas. L.,	409 Broadway,	Cincinnati.
Hall, Joseph A.,	628 Elm St.,	Cincinnati.
Hall, Rufus B.,	628 Elm St.,	Cincinnati.
Miller, John D.,	N. E. Cor. Clifton & McMillan,	Cincinnati.
Reed, C. A. L.,	The Groton,	Cincinnati.
Stark, Sigmar,	1108 East McMillan St.,	Cincinnati.
Tate, Magnus A.,	19 West Seventh St.,	Cincinnati.
Zinke, E. Gustav,	4 West Seventh St.,	Cincinnati.
Crile, George W.,	Osborn Bldg.,	Cleveland.
Humiston, William H.,	536 Rose Bldg.,	Cleveland.
Lincoln, Walter R.,	Lennox Bldg.,	Cleveland.
Scott, N. Stone,	603 Citizens Bldg.,	Cleveland.

Skeel, Arthur,	1834 East 65th St.,	Cleveland.
Skeel, Roland Edward,	314 Osborn Bldg.,	Cleveland.
Baldwin, James F.,	405 East Town St.,	Columbus.
Crotti, André,	1728 East Broad St.,	Columbus.
Goodman, Sylvester J.,	238 State St.,	Columbus.
Hamilton, Chas. S.,	142 South Garfield St.,	Columbus.
Stamm, Martin,	316 Napoleon St.,	Fremont.
Dice, Wm. Gordon,	240 Michigan St.,	Toledo.
Gillette, Wm. J.,	1613 Jefferson St.,	Toledo.
Jacobson, Julius H.,	2050 Franklin St.,	Toledo.
Moots, Chas. W.,	The Nicholas,	Toledo.
Smead, Lewis F.,	242 Michigan St.,	Toledo.
Smith, Chas. N.,	234 Michigan St.,	Toledo.
McClellan, Benjamin B.,	7 East Second St.,	Xenia.

PENNSYLVANIA.

Kennedy, James W.,	1409 Spruce St.,	Philadelphia.
Blume, Frederick,	Jenkins Bldg.,	Pittsburg.
Foster, Curtis S.,	308 Diamond Bank Bldg.	Pittsburg.
Freeland, James R.,	4715 Fifth Ave.,	Pittsburg.
Huggins, R. R.,	1018 Westinghouse Bldg.,	Pittsburg.
Langfitt, William S.,	Jenkins Bldg.,	Pittsburg.
Sanes, K. I.,	Park Bldg.,	Pittsburg.
Schildecker, Charles B.,	1105 Park Bldg.,	Pittsburg.
Simpson, Frank F.,	Jenkins Bldg.,	Pittsburg.
Smith, Louis Watson,	1624 Station St.,	Pittsburg.
Stillwagen, Charles A.,	524 Pennsylvania Ave.,	Pittsburg.
Swope, Lorenzo W.,	1105 Park Bldg.,	Pittsburg.
Weiss, Edward A.,	714 Jenkins Bldg.,	Pittsburg.
Werder, Xavier O.,	Jenkins Bldg.,	Pittsburg.
Ziegler, Chas. E.,	354 South Highland Ave.,	Pittsburg.

RHODE ISLAND.

Jones, Arthur T.,	81 Elm Grove Ave.,	Providence.
Keefe, John W.,	259 Benefit St.,	Providence.

TENNESSEE.

Haggard, William D.,	148 Eighth Ave., North,	Nashville.

VIRGINIA.

Baughman, Greer,	26 North Laurel St.,	Richmond.
Bosher, Lewis C.,	422 East Franklin St.,	Richmond.

MINUTES OF THE PROCEEDINGS

AT THE

TWENTY-SEVENTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

HELD AT

HOTEL IROQUOIS

BUFFALO, N. Y.

SEPTEMBER 15, 16, AND 17, 1914

TWENTYS-EVENTH ANNUAL MEETING.

SEPTEMBER 15, 16, and 17, 1914.

The following-named Fellows were present:

BAINBRIDGE, WM. SEAMAN, . . NEW YORK CITY.
BALDWIN, JAMES F., ... COLUMBUS, OHIO.
BARRETT, CHANNING W., . . . CHICAGO, ILL.
BELL, JOHN N., ... DETROIT, MICH.
BILL, ARTHUR H.,. . . . . CLEVELAND, OHIO.
BONIFIELD, CHAS. L., ... CINCINNATI, OHIO.
BROWN, GEORGE VAN AMBER, DETROIT, MICH.
BROWN, WM. MORTIMER, . . . ROCHESTER, N. Y.
CARSTENS, J. HENRY, ... DETROIT, MICH.
CHANDLER, GEORGE, ... KINGSTON, N. Y.
CONGDON, CHARLES E., ... BUFFALO, N. Y.
CRILE, GEORGE W., ... CLEVELAND, OHIO.
DARNALL, WM. EDGAR, ... ATLANTIC CITY, N. J.
DAVIS, ASA BARNES, ... NEW YORK CITY.
DICE, WILLIAM C., ... TOLEDO, OHIO.
DICKINSON, GORDON K., . . . JERSEY CITY, N. J.
EASTMANN, THOMAS B., ... INDIANAPOLIS, IND.
ERDMANN, JOHN FREDERICK, NEW YORK CITY.
FOSTER, CURTIS S., ... PITTSBURGH, PA.
FREELAND, JAMES ROY, ... PITTSBURGH, PA.
FURNISS, HENRY DAWSON, . . NEW YORK CITY.
GOLDSPOHN, ALBERT, ... CHICAGO, ILL.
GRAY, FRANK DELOS, ... JERSEY CITY, N. J.
HADDEN, DAVID, ... OAKLAND, CAL.
HARRAR, JAMES A.,. . . . . NEW YORK CITY.
HAYD, HERMAN EMIL, ... BUFFALO, N. Y.
HUMISTON, WILLIAM HENRY, . CLEVELAND, OHIO.
JACOBSON, JULIUS H., ... TOLEDO, OHIO.
JONES, ARTHUR THOMAS, . . . PROVIDENCE, R. I.
KEEFE, JOHN WILLIAM, ... PROVIDENCE, R. I.
KING, JAMES E., ... BUFFALO, N. Y.
LOTHROP, EARL P., ... BUFFALO, N. Y.

McCLELLAN, BENJAMIN R., . . . Xenia, Ohio.
McPHERSON, ROSS, ... New York City.
MARVEL, EMERY, ... Atlantic City, N. J.
MEEKER, HAROLD DENMAN, . New York City.
MILLER, AARON BENJAMIN, . . Syracuse, N. Y.
MOOTS, CHARLES W., ... Toledo, Ohio.
MORIARTA, DOUGLAS C., . . . Saratoga Springs, N. Y.
MORRIS, ROBERT T., ... New York City.
NOBLE, THOMAS B., ... Indianapolis, Ind.
OLMSTED, INGERSOLL, ... Hamilton, Ontario, Canada.
PANTZER, HUGO OTTO, ... Indianapolis, Ind.
PFAFF, ORANGE G., ... Indianapolis, Ind.
PORTER, MILES F., ... Fort Wayne, Ind.
POTTER, IRVING WHITE, . . . Buffalo, N. Y.
POUCHER, JOHN WILSON, . . . Poughkeepsie, N. Y.
REDER, FRANCIS, ... St. Louis, Mo.
RONGY, ABRAHAM J., ... New York City.
SADLIER, JAMES E., ... Poughkeepsie, N. Y.
SANES, K. ISADORE, ... Pittsburgh, Pa.
SCHILDECKER, CHARLES B., . . Pittsburgh, Pa.
SKEEL, ARTHUR JULIUS, . . . Cleveland, Ohio.
SMEAD, LEWIS FREDERIC, . . . Toledo, Ohio.
SMITH, CHARLES NORTH, . . . Toledo, Ohio.
STILLWAGEN, CHARLES A., . . . Pittsburgh, Pa.
STRASSER, AUGUST ADRIAN, . Arlington, N. J.
VAN SWERINGEN, BUDD, ... Fort Wayne, Ind.
VANDER VEER, EDGAR ALBERT, Albany, N. Y.
WADE, HENRY ALBERT, ... Brooklyn, N. Y.
WEISS, EDWARD A., ... Pittsburgh, Pa.
WELTON, THURSTON SCOTT, . . Brooklyn, N. Y.
WERDER, X. O., ... Pittsburgh, Pa.
ZINKE, ERNST GUSTAV, ... Cincinnati, Ohio.

Total, 64.

The following-named registered guests were extended the privileges of the floor and invited to participate in the discussions:

Alwood, H. L., ... Collins Centre, N. Y.
Brennan, Joseph P., ... Buffalo, N. Y.
Brickell, Fred. S., ... Silver Creek, N. Y.
Clark, A. H., ... Buffalo, N. Y.

Comstock, Francis E., ... Wellsville, N. Y.
Davis, Arthur Geo., ... Buffalo, N. Y.
Davis, James E., ... Detroit, Mich.
Davis, Wm., ... Buffalo, N. Y.
Dieckmann, Louis, ... Buffalo, N. Y.
Donovan, Timothy F., ... Buffalo, N. Y.
Drake, F. A. . . . . Buffalo, N. Y.
Dwyer, Thomas F., ... Buffalo, N. Y.
Frye, Maud J., ... Buffalo, N. Y.
Gage, George H., ... Rochester, N. Y.
Gelser, George M., ... Rochester, N. Y.
Goldborough, F. C., ... Buffalo, N. Y.
Haller, George J., ... Buffalo, N. Y.
Hennington, C. W., ... Rochester, N. Y.
Hewitt, H. W., ... Detroit, Mich.
Jetman, Wm. T., ... Buffalo, N. Y.
Johnson, A. R., ... Buffalo, N. Y.
Johnson, Irving R., ... Buffalo, N. Y.
Johnson, Wm. H., ... Buffalo, N. Y.
Kavinoky, Nadina R., ... Buffalo, N. Y.
Kavinoky, Samuel, ... Buffalo, N. Y.
Kuhlmann, Helene, ... Buffalo, N. Y.
Lee, George H., ... Galveston, Texas.
Lewis, Joseph S., ... Buffalo, N. Y.
McKenner, D. C. . . . . Buffalo, N. Y.
Marcy, Wm. Henry, ... Buffalo, N. Y.
May, Herman F., ... Buffalo, N. Y.
Meister, Edward F., ... Buffalo, N. Y.
Nairn, B. Ross, ... Buffalo, N. Y.
Pettitt, John A., ... Buffalo, N. Y.
Pryor, John H., ... Buffalo, N. Y.
Quigley, J. K., ... Rochester, N. Y.
Reese, Francis G., ... Caudersport, Pa.
Ruben, Jacob A., ... Pittsburgh, Pa.
Schlossingk, K. E., ... New York City.
Smith, Chauncey P., ... Buffalo, N. Y.
Taylor, M. J., ... Poughkeepsie, N. Y.
Thomson, Archibald W., ... Poughkeepsie, N. Y.
Thornton, Wm. H., ... Buffalo, N. Y.
Trick, Harry R., ... Buffalo, N. Y.
Thrush, Chas. A. McL., ... Dunnville, Ont.
Tyler, Clarence A., ... Alden, N. Y.

Ullman, Julius, ... Buffalo, N. Y.
Van Peyma, P. W., ... Buffalo, N. Y.
Wixson, Roy H., ... Niagra Falls, N. Y.
Whitford, Wm. . . . . Chicago, Ill.
Total, 50.

FIRST DAY—*Tuesday, September* 15, 1914.

Morning Session.—The Association met in the ball-room of the Iroquois Hotel at 9 : 30 A. M., and was called to order by the President, Dr. Charles N. Smith, Toledo, Ohio.

DR. JOHN H. PRYOR, President of the Buffalo Academy of Medicine, was introduced and delivered the following

ADDRESS OF WELCOME.

Mr. President and Members of the American Association of Obstetricians and Gynecologists: As President of the Buffalo Academy of Medicine, the rare pleasure has been afforded me of welcoming you cordially to this city. The medical profession extends to you its warmest greetings and best wishes for a most successful meeting, and a pleasant profitable visit. We hope that you may find time to see something of our most beautiful city and accept and enjoy the hospitality of its people. The honor of your presence here is fully appreciated, and we realize the importance of this unusual gathering of distinguished leaders in a grand field of special humane endeavor. Your mission is to prevent and alleviate the suffering and distress of womankind who in compliance with the stern laws of Nature bear so heavily a burden of the pain in the world. In no country is the life, comfort and happiness of woman more highly valued than it is in America. I have sometimes wondered if the American chivalric solicitude for the welfare of womankind has not been in a large degree responsible for the brilliant attainments which have characterized the wonderful advancement in your special path of service.

Thus far the brightest pages in the history of American medicine are dedicated to the illustrious achievements gained by great leaders who were your predecessors. You have great and glorious traditions to revere and perpetuate. However well you may know the history of tremendous progress in the crusade for the relief of afflicted unfortunate woman, have patience and allow one more acknowledgement of pride and gratification that the world learned the science and art from America. Gynecology was born here. It has been developed and perfected to a large extent here. The culmination and

supremacy should be held here. May this session leave a mark of higher advancement. You are assembled here in conference to teach and learn all that the laboratories, the bed-side and operating room can yield, and then depart to resume the struggle against the misery which must yield to more knowledge and skill. Your meeting here is undisturbed by a radically different form of warfare. Here the problem is to make the ushering in of a new life as devoid of risk and anguish as possible. To save life and rob it of distress. In other lands stricken with hideous mad destruction of life, many women must have suffered and toiled only to be bereft, and they can only mourn and helplessly wonder why. What a strange paradoxical enigma is the thing we call fame. How many women have ever heard of McDowell or Sims, whose names should be imperishable as the great pioneers and true conquerors who conferred incalculable blessings upon their kind. Let the quiet, untrumpeted conflict go on. There is chance enough for toil, bravery and high accomplishment in the enlightened precincts of medical science illuminated by a brilliant path and the radiant gleams of a new dawn so full of promise for a loftier conception of the brotherhood of humanity. Great responsibility rests upon the leaders in the medical profession to-day. Trust and reliance must be sustained. The influence and insidious dangers of a commercial age must be met and resisted. There must be just and fearless criticism and discipline in our ranks. Protect the good name of scientific surgery based upon training and experience under supervision and comprehensive knowledge of pathology. Beware of excessive ignorance, needless interference and selfish exploitation. The advance in surgery is one of the marvels of the age. Be careful that the luster of its annals shall not be blurred because research has lessened the danger of attack and encouraged an invasion of alleged operators and hasty unnecessary use of the knife regardless of consequences.

May this meeting become a memorable one and your sojourn so pleasant and satisfactory that you will soon be our welcome guests again. (Applause.)

ADDRESS OF WELCOME ON BEHALF OF THE CITY BY MR. SAMUEL SAYLES.

Mr. President and Members of the American Association of Obstetricians and Gynecologists: I am sorry that the Mayor himself could not be present to extend a word of greeting to you. He is out of the city and will not return for a week, consequently it devolves upon me to come here and say that the city of Buffalo is all yours. This

privilege is mine, possibly a hundred times a year, and this is the year number five I have been doing it, so that you can imagine somewhat how I feel when I face this distinguished gathering. (Applause.)

I am a lawyer at present; I was formerly a clergyman, and I began life as drug clerk. My office has touched yours slightly in more than one way. I always think that the medical profession really drain a richer mental area than any other. I am not going back on the legal profession or the ministerial profession, but there is something about the average physician, always supposing you are such, that appeals to me mightily. Every profession carries with it certain psychological traits. You can tell a clergyman as far as you can see him; you can tell almost every lawyer as far as you can hear him; but the physicians are in a class to themselves. There is nobody just like them. I once heard Bishop Brooks preach on identity and variety, unity and adversity. I was only a lad then; I could not see much in such a theme to unfold, but I think the medical profession illustrates that as well as any other. You certainly have identity and variety. There is something about you unlike that of other professional men, and yet there are no two of you alike. There are all kinds of physicians and specialists, and what not, but I will say this in absolute good faith: I do not know of a physician that has not got his head with him most all of the time. May be the preacher has more heart than the other fellow, but I always thought the medical profession was long on brains and least of a certain kind, and I am sure that you have raised the average in the city of Buffalo this morning. The tide will be just a little higher because you gravitated into this city. You will not make as much noise as the members of some other professions and some other conventions; you may not be what we call good spenders. I am not alarmed about that one way or the other. (Laughter.) But I know this, that you will make a contribution not only to yourselves but to the city of Buffalo; that our city will be a bit richer for your having made this sojourn with us.

This is a great city you have come to. It is the tenth numerically in the United States. It is a great city historically. It was born since the American Revolution. It was burnt to ashes by British torches in the second war with Great Britain. It is the city of Millard Fillmore, and Grover Cleveland, two great presidents of the United States, and I always stop in an ordinary audience and expect a little applause, but when I get among the Cassanders of the universe I pass on; I know it never touches them. (Laughter.) There is one thing about us intellectuals, we never give up sailing without giving the *quid pro quo*, or something for something. This is a city

in which a great convention was held in 1848. Some of you have doubtless read about it, when Harriet Beecher Stowe, Wendell Phillips or Lloyd Garrison did more to popularize sentiment in the United States, which resulted in the emancipation of the black race, than any other single fact in the history of our country—free soil, free speech and free men. That was the banner floating on the outer wall here a dozen years before the rebellion. (Applause.)

This is the city of the great Pan-American Exposition which breathed concord and good will to all of the Republics of North and South America and the entire world. This is the city from which William McKinley of blessed memory passed into the unseen and eternal; a city in which Theodore Roosevelt was sworn into office as President of the United States. (Applause.)

This is a great city racially, my friends. It is the best balanced city racially in the United States. We have approximately half a million people here; 125,000 of German blood and descent; 90,000 of Polish blood and descent; 40,000 Italians, and no man knows how many Irish. They never stopped long enough to count them. (Laughter.) But the Irish are among the very best citizens we have. We have all religions and we know how to live in peace and good will with one another. It is a great tolerant, progressive city, each man willing to let the other work out his own destiny according to his own conscience.

Those who come from Boston know what a racial population there is there. The same is true of New York City. In the Western cities some are Scandinavian, some German; in some of the Southern cities the colored population predominates, but here in this city we are a little of everything and the best of every kind on earth.

This is a great city industrially. Gentlemen, that may not appeal to you at first as of any great importance, yet it does mean very much to our kind, for the progress of the Union rests upon our industrial and our commercial life, and if you and I are living more without working with our hands and our hearts, you can be sure somebody else is working while you and I work the worker. (Laughter.)

According to the census reports, Buffalo grew faster in the last decade industrially than any other city in the United States, and according to the same reports Buffalo has been the most forcible in industrial life of any city in the United States. As you know, Detroit is the home of the automobile industry; Pittsburgh steel, and everybody knows what made Milwaukee famous. Even physicians know that, but in this city we have all kinds of industrial life. It is a beautiful city. We have hundreds of acres of beautiful parks; we

have more asphalt pavement than any city in the United States or any city in the world. We are the fifth in our marine life. We are to-day building four great high school buildings, and if you have an hour's journey to make you could not find more profitable exercise than to see these four high school buildings that are going up.

Buffalo is a great progressive American city, and its doors are wide open to you. You can go as far as you like, and I do not think I am taking much of a chance at that, and stay as long as you may and the whole city is yours from Dan to Beersheba. (Loud Applause.)

RESPONSE BY DR. HUGO O. PANTZER.

Mr. President, Dr. Pryor and Mr. Sayles: I am sure every one in this audience is keenly appreciative of the kindly and happy sentiments expressed in behalf of the profession by Dr. Pryor, and especially in that part of our profession espoused by this Association, and of the remarks by Mr. Sayles extending to us a hearty welcome to this beautiful and noble city. It is with great pleasure, in behalf of the Association, that I wish to assure Mr. Sayles that the guests of this day are more than ordinarily appreciative of these kindly greetings and expressions of good will of those he represents. (Applause.)

The fame of your noble city has spread to all lands, and as citizens of this great country we each and all rejoice in your great civic success. But more than the natural beauty of this city, more than the fine spirit and high culture of its inhabitants, more than its great accomplishments along the lines of manufacture and commerce, there is for your guests on this day an interest and pride in your city that partakes of the quality of veneration and even worship, for it was in this beautiful and inspiring city that the formation of our Association was first discussed and planned in the year 1888. This city is the bridal chamber, so to speak, in which the life of this Association was conceived, hence your words of welcome to us are fraught with special significance and joyous satisfaction. In this city there lived, labored and bloomed that beautiful and inspiring life, that genial, kindly and helpful man, Dr. William Warren Potter. As Secretary of the Association for twenty-three years, he was, it may be truly said, the soul of the Association. All of us miss him here on this occasion, and his absence casts a sense of deep grief over us.

To meet in a great and beautiful city like this is a privilege that is greatly appreciated by your guests of this day. We thank you and the citizens of Buffalo, as well as the medical profession, for what this privilege signifies to us. (Applause.)

Papers were then read as follows

1. "The Necessity of Constantly Looking for Cancer of the Uterus," by Dr. J. Henry Carstens, Detroit, Michigan.

This paper was discussed by Drs. Jacobson, Barrett, Gray, Dickinson, Bonifield, and discussion closed by the author of the paper.

2. "Abdominal Distention Following Operations upon the Pelvic Viscera," by Dr. Francis Reder, St. Louis, Missouri.

Discussed by Drs. Pantzer, Dickinson, Gray, Darnall, Bell, Morris, Carstens, and in closing by the essayist.

3. "Some Phases of Vaginal Repair," by Dr. Henry A. Wade, Brooklyn, New York.

Discussed by Drs. Goldspohn, McPherson, Dickinson, Marvel, Barrett, Gray, Weiss, and in closing by the essayist.

4. "Renal Damage from Calculi," by Dr. Henry Dawson Furniss, New York City.

Discussed by Drs. Bonifield, Porter, Smead, Pantzer, Zinke, Erdmann, Jacobson, and discussion closed by the essayist.

On motion, the Association took a recess until 2 : 30 P. M.

Afternoon Session, 2 : 30 o'clock.

The President in the Chair.

5. "Myomectomy with Extensive Resection of the Uterus in Fibroid Tumors," by Dr. X. O. Werder, Pittsburgh.

This paper was discussed by Drs. Dickinson, Carstens, Morris, Pantzer, McPherson, Jacobson, Miller, and the discussion closed by the essayist.

6. "Resection of Ovaries," by Dr. Albert Goldspohn, Chicago.

Discussed by Drs. Reder, Pantzer, Gray, and in closing by the essayist.

7. "The Torsion of Ovarian Cysts," by Dr. K. Isadore Sanes, Pittsburgh.

Discussed by Drs. Barrett, Goldspohn, Pantzer, and in closing by the author of the paper.

8. "Two Cases of Advanced Cancer of the Uterus Apparently Cured by Postoperative Infections," by Dr. John W. Poucher, Poughkeepsie, New York.

This paper was discussed by Drs. Reder, Pantzer, Porter, Moots, and in closing by the author of the paper.

9. "Factors Determining the Morbidity of Surgical Cases," by Dr. Charles W. Moots, Toledo, Ohio.

Discussed by Drs. Crile, Hewitt, Mann, Bonifield, Carstens, Erdmann, Marvel, and in closing by the essayist.

10. "Mineral Springs of Saratoga," by Dr. Douglas C. Moriarta, Saratoga Springs, New York. (No discussion.)

11. "Some Observations on the Technic of Intestinal Anastomosis with Special Reference to the Modification of the Maunsell Method," by Dr. Frank D. Gray, Jersey City, New Jersey.

Discussed by Drs. Reder, Dickinson, Goldspohn, Pantzer, and in closing by the essayist.

On motion, the Association took a recess until 9:30 A. M., Wednesday.

NOTE: In the evening the Association was the guest of Dr. Harvey R. Gaylord, at the New York State Institution and Hospital for the Study of Malignant Disease.

Dr. Gaylord used lantern slides to illustrate the experimental work carried on in the institution. He referred to the researches and experiments with regard to cancer in fish and other animals. Dr. M. C. Marsh, biologist of the Institution, gave a talk on "Breeding Experiments in Relation to Heredity;" Dr. F. West, assistant chemist, spoke on "Blood Reaction in Diagnosis;" Dr. Burton J. Simpson, pathologist, discussed the "Diagnosis of Cancer for the Profession," while Dr. Joseph Lewis, statistician, spoke on the "Study of Cancer Statistics of New York State."

SECOND DAY—*Wednesday, September* 16, 1914.

Morning Session.—The Association met at 9:30 A. M. and was called to order by the President.

12. "Delayed Union in Noninfected Epigastric Wounds," by Dr. Miles F. Porter, Fort Wayne, Indiana.

This paper was discussed by Drs. Brown, Smead, Davis, Goldspohn, Pantzer, Gray, Humiston, and the discussion closed by the author of the paper.

13. "Ruptured Gastric and Duodenal Ulcer," by Dr. Edgar A. Vander Veer, Albany, New York.

Discussed by Drs. Erdmann, Morris, Porter, Van Swearingen, Moots, Noble and Gray.

14. "Biliary Surgery," by Dr. John F. Erdmann, New York City.

15. "Anastomosis of the Gall-bladder to the Stomach," by Dr. Julius H. Jacobson, Toledo, Ohio.

16. "Gastrocholecystectomy," by Dr. Julius H. Jacobson, Toledo, Ohio. (No discussion.)

17. "Congenital Pyloric Stenosis Operated by the Keefe Method," by Dr. Charles L. Bonifield, Cincinnati, Ohio.

Discussed by Drs. Porter, Keefe, and in closing by essayist.

18. "Abdominal Drainage," by Dr. John W. Keefe, Providence, Rhode Island.

This paper was discussed by Drs. Moots, Goldspohn, Gray, Marvel, Carstens, Bainbridge, Morris, Hadden, and in closing by the essayist.

On motion, the Association took a recess until 2 : 30 P. M.

Afternoon Session, 2 : 30 o'clock.

The President in the Chair.

18. "The Postoperative Treatment of Urinary Lithiasis," by Dr. Charles B. Schildecker, Pittsburgh.

19. "Bacteriologic Findings in the Urine in Cases Associated with Urine Stasis," by Dr. David Hadden, Oakland, California.

20. "Appendicitis as a Cause of Cecal Stasis," by Dr. Hugo O. Pantzer, Indianapolis.

These papers were discussed together by Drs. Carstens, Morris, and discussion closed by Drs. Hadden and Schildecker.

21. "Transverse Inversion of the Colon; A Technical Step in the Short-circuiting Operation," by Dr. Robert T. Morris, New York City.

22. "Plastic Operation for Correction of Ceco-colon Stasis," by Dr. Emery Marvel, Atlantic City, New Jersey.

These two papers were discussed by Drs. Bonifield, Brown, Noble, Jacobson, Hadden, Carstens, and in closing by Drs. Pantzer, Morris and Marvel.

24. "The Technic I Prefer in Pelvic Disease," by Dr. William H. Humiston, Cleveland, Ohio. (No discussion.)

On motion, the Association took a recess until Thursday, 9 : 30 A. M.

THIRD DAY—*Thursday, September 17, 1914.*

Morning Session.—The Association met at 9 : 30 A. M., and was called to order by the President.

25. "Operative Findings in Twelve Cases of Chronic Intestinal Stasis, Illustrated by Several Stereopticon Slides," by Dr. William Seaman Bainbridge, New York City.

Discussed by Drs. Crile, Pantzer, Carstens, Hadden, Zinke, and the discussion closed by the author of the paper.

26. "The Kinetic System and the Treatment of Peritonitis," by Dr. George W. Crile, Cleveland, Ohio.

Discussed by Drs. Carstens, Gray, Humiston, Jacobson, Miller, and in closing by the essayist.

27. "Ectopic Pregnancy and the General Practitioner," by Dr. Benjamin R. McClellan, Xenia, Ohio.

Discussed by Drs. Jacobson, Pantzer, Goldspohn, Gray, Baldwin, Barrett, and the discussion closed by the essayist.

28. "Operations at the Home and under what Circumstances are They Justifiable?" By Dr. James E. Sadlier, Poughkeepsie, New York.

Discussed by Dr. Dickinson.

29. "A Report of all Abdominal Cesarean Operations Performed in the Service of the Lying-In Hospital," by Dr. Asa B. Davis, New York City.

Discussed by Drs. Baldwin, Rongy, Dickinson, Barrett, Brown, Lee, Bell, Humiston, Bonifield, Skeel, Zinke, and the discussion closed by the author of the paper.

30. "Treatment of Puerperal Thrombo-Phlebitis," by Dr. James F. Baldwin, Columbus, Ohio.

Discussed by Drs. Rongy, Davis, Bell, and discussion closed by the essayist.

On motion, the Association took a recess until 2 : 30 P. M.

Afternoon Session, 2 : 30 o'clock.

The President in the Chair.

31. "A Year's Experience with the Abderhalden Reaction," by Dr. Arthur E. Skeel, Cleveland, Ohio.

Discussed by Dr. Davis.

32. "Pregnancy and Incipient and Inactive Tuberculosis," by Dr. William Gordon Dice, Toledo, Ohio.

Discussed by Drs. McPherson, Skeel, Dickinson, Bell, Bainbridge, Zinke, and in closing by the essayist.

33. "Statistics of Labor in Elderly Primipara," by Dr. James Roy Freeland, Pittsburgh.

Discussed by Dr. Pantzer.

34. "Treatment of Abortion on the Basis of Its Pathology," by Dr. Channing W. Barrett, Chicago.

Discussed by Drs. Humiston, Davis, Bonifield, Rongy, and in closing by the essayist.

35. "The Use of Scopolamin Hydrobromid-Narcophen in Labor," by Dr. Abraham J. Rongy, New York City.

36. "Scopolamin–Morphin Narcosis in Labor," by Dr. James A. Harrar, New York City.

These papers were discussed together by Drs. McPherson,

Schlossingk, Goldsborough, Pantzer, Reder, Bell and discussion closed by the essayists.

INSTALLATION OF OFFICERS.

THE PRESIDENT.—This brings to a close the scientific program and practically closes the twenty-seventh annual meeting of this Association. I think you will agree with me that it has been one of the most successful sessions we have ever held. The Secretary has some interesting statistics to give you concerning this meeting.

THE SECRETARY.—We have had an average attendance of seventy-eight at all sessions, and one hundred and sixteen men registered, of whom sixty-three are Fellows of the Association. There were thirty-six papers read, exclusive of those read at Dr. Gaylord's Institution. The number of calls upon the Chair during the session has been two hundred and two, which is very unusual. The meeting has distinguished itself by a very large and attentive audience, and the impression that has been created in Buffalo, I am sure, will be a lasting one. (Applause.)

THE PRESIDENT.—Now comes the induction of the newly elected officers. I will appoint Drs. Barrett and Sadlier to escort the newly elected President to the Chair, and Dr. Pantzer and Dr. Harrar to escort the First Vice-President, Dr. Davis, to the platform.

THE PRESIDENT.—Gentlemen: These are our newly elected officers, the stars of greatest magnitude which you have selected to preside over your deliberations, the welfare and progress of the Association for the ensuing year. You have chosen wisely. I congratulate them and I congratulate you. Mr. President (referring to Dr. Bonifield), I present to you this gavel which gives you authority to preside over this organization, and I trust you will not always use it at the end of five minutes. Once in a while, when a man has a message to deliver, I hope you will forget to look at your watch.

I thank you, gentlemen. I regret to yield this office; I regret it because I am like Ben Butler, I am done for. (Laughter and applause.)

DR. BONIFIELD, in accepting the Presidency, said: We hope to see each and all of you at the meeting in Pittsburgh next year. As Dr. Zinke has told you, this is one of the best meetings we have ever had, and we hope the next one will be a little bit better. Last night President Smith in speaking of some of the old war horses, held up Dr. Carstens to you as a model worker, and so on. I want to hold him up to you as a model for another thing, and that is, speaking

loudly enough so that he can be heard. I want to make this remark now, so that some of you will benefit by it next year. I have been told that Dr. Carstens used to go to the woods to develop his voice. I hope the members will all exercise their vocal cords during the coming year, so that when they get on the floor in Pittsburgh everybody in the room will be able to hear them. When I was elected I said I deemed it the greatest honor that has ever come to me to be President of this Association. It is an honor that will ever be appreciated by me, and probably the greatest honor that will ever come to me. Therefore, I shall fulfill the duties of the office as best I can, following in the footsteps of my predecessor, and that will be all any one can expect. Again, I thank you. (Applause.)

Dr. Davis, in accepting the First Vice-Presidency, said: We have heard a great deal of eloquent and instructive talk. I feel very much like the Irishman who said he was bankrupt in eloquence, but entirely solvent in feeling. (Laughter and applause.)

Dr. Channing W. Barrett.—I move that the Association extend a vote of thanks to the citizens of Buffalo and the medical profession of Buffalo for the entertainment we have received while we have been here.

Motion seconded by several and carried unanimously by a rising vote.

As there was no further business to come before the meeting, the President thereupon declared the Association adjourned to meet next year in Pittsburgh.

E. Gustav Zinke, M. D., *Secretary.*

EXECUTIVE SESSIONS.

Tuesday, September 15, 1914.

The President, Dr. Charles N. Smith, Toledo, Ohio, in the Chair.

The President.—The first business of this session is the election of new Fellows to membership. The Secretary will read the list.

The Secretary presented the following list of applicants for Fellowship, which had been favorably acted upon by the Executive Committee and recommended to the Association for election: Dr. Arthur Holbrook Bill, Cleveland, Ohio; Dr. George Chandler, Kingston, New York; Dr. Adam P. Leighton, Portland, Maine; Dr. Harold Denman Meeker, New York City; Dr. Irving White Potter, Buffalo, New York; Dr. August Adrian Strasser, Arlington, New Jersey; Corresponding Fellows: Dr. Kedarnath Das, Calcutta; Dr. A. Hertoghe, Antwerp.

The President: What will you do with this recommendation of the Council?

Dr. John F. Erdman.—I move they be elected to membership.

Seconded and carried.

The Secretary.—One application came in later, I did not receive it because of my delay in Europe and on account of some delay on the part of the candidate. The applicant is Dr. Thurston Scott Welton, Brooklyn, New York, endorsed by Drs. Chase and Wade.

The President.—What will you do with this application?

Dr. Carstens.—I move the rules be suspended and the Secretary instructed to cast the ballot of the Association for Dr. Welton's election.

Seconded and carried.

The Secretary cast the ballot as instructed and Dr. Welton was declared duly elected.

Dr. Francis Reder.—There is an Ex-President of the Association who would like very much to be with us at this meeting, but serious illness prevents him from coming. I have reference to Dr. Walter B. Dorsett, of St. Louis. I called upon him a week ago and he expressed deep regret at his inability to be with us and asked that he be remembered to the Fellows. I hope the Association will see fit to send greetings and a word of good cheer to Dr. Dorsett. However, I will leave the matter in the hands of the members.

Dr. Carstens.—I move that our Secretary be instructed to send a telegram of sympathy to Dr. Dorsett, expressing our great regret at his inability to be present, with our best wishes for his speedy recovery.

Seconded and carried.

The Secretary.—Dr. David Hadden has presented two communications in reference to our meeting in California next year. One is from the Oakland Commercial Club, inviting us to meet in Oakland, and the other inviting us to meet in San Francisco.

The President.—What disposition do you wish to make of these invitations?

Dr. Carstens.—We generally settle the next place of meeting at the Wednesday evening meeting, and I move that it be referred to that meeting.

Seconded and carried.

Adjourned.

Wednesday, September 16, 1914.

The Executive Session was called to order by the President immediately after the adjournment of the scientific session.

The Secretary read telegrams from Drs. Lewis S. McMurtry, R. E. Skeel, Edward J. Ill, and Walter B. Dorsett, all regretting their inability to attend the meeting.

The Secretary.—I have taken in during the past year a little over $2600, all of which I have turned over to the Treasurer. I also sent him every bill o.k.'d that he might have the privilege of paying it. An auditing committee will be appointed to go over the accounts and report back to you as to whether the books and accounts have been properly kept. The Treasurer, Dr. Hayd, can tell you more about the finanecs of the Association.

Dr. Herman E. Hayd.—As your Treasurer, I will say the books speak for themselves. We carried a balance last year of $508.53. We have in the Treasury now $938.54. I may also add that we have paid $273.10 of the expenses of this year, so that our balance next year will be a handsome one. If you will appoint an auditing committee, Mr. President, in about three minutes they can go over the books, and that part of the business will have been transacted.

The President.—I will appoint Dr. Pantzer and Dr. Reder as an auditing committee to examine the books of the Treasurer and Secretary and report back to the Association.

We will now proceed with the election of officers, the first of which is President. The Chair will entertain nominations for President of the Association for the ensuing year.

Dr. Miles F. Porter.—I would like to place in nomination for President a man who needs no introduction. I only need to mention his name—Bonifield of Cincinnati.

The nomination of Dr. Bonifield was seconded by several.

The President.—Are there any other nominations?

Dr. Carstens.—I move that nominations be closed, that the rules be suspended and the Secretary instructed to cast the ballot of the Association for Dr. Bonified of Cincinnati.

Seconded and carried.

The Secretary cast the ballot as instructed and Dr. Bonifield was declared duly elected President for the ensuing year.

There were cries of Speech! Speech!

Dr. Bonifield said: Gentlemen: I will not detain you to make a speech. The only thing I have to say is, I appreciate this more than any honor I have ever had in my life, and if you think by electing me President you are going to shelve me, you are much mistaken. (Laughter.) I will not discuss things very much next year, but year after next I will be just as much in your way as I have been in the past. I thank you. (Applause.)

THE PRESIDENT.—Nominations of First Vice-President are in order.

DR. JOHN W. KEEFE.—I would like to place in nomination for First Vice-President, Dr. Asa B. Davis, of New York.

Seconded.

DR. MILES F. PORTER.—I move that nominations be closed, that the rules be suspended, and the Secretary instructed to cast the ballot for Dr. Davis as First Vice-President.

Seconded and carried.

The Secretary cast the ballot as instructed and Dr. Davis was declared duly elected First Vice-President.

There were cries of Speech! Speech!

DR. DAVIS said: I thank you very much for electing me to the position of First Vice-President. I feel there are men who have been in the Association longer than I to whom this office should be properly given, but all I can say is, I thank you. (Applause.)

THE PRESIDENT.—Nominations for Second Vice-President.

DR. WEISS.—I nominate Dr. K. I. Sanes, of Pittsburgh, for Second Vice-President.

DR. HUMISTON.—I second the nomination.

DR. PORTER.—I move that nominations be closed, and that the rules be suspended and the Secretary instructed to cast the ballot for Dr. Sanes.

Seconded and carried.

The Secretary cast the ballot as instructed and Dr. Sanes was declared duly elected Second Vice-President.

THE PRESIDENT.—Nominations for Secretary. Whom do you want for Secretary?

There were cries of Zinke! Zinke!

DR. WILLIAM H. HUMISTON.—I move that the rules be suspended, and that the President cast the ballot of the Association for the election of Dr. Zinke as Secretary to succeed himself.

Seconded and carried.

The President cast the ballot as instructed and Dr. Zinke was declared duly elected Secretary.

There were cries of Speech! Speech!

DR. ZINKE said: In the year of 1907 we met at Detroit and I attended the meeting as unconcernedly as usual. Before I went home I found myself elected President of this Association for the next year. There was some discussion as to who should be elected President. There were several Fellows then in the Association who were ahead of me, not in years, but in line of service, and, it was reported, somebody said: "We had better give the honor to Dr.

Zinke; he is getting old; he may die soon; let him enjoy the office while he may." (Laughter.) A few years later, Louisville, Zinke was elected Secretary. He did not reduce his years, but kept on adding to them and growing younger. He is now in his sixty-ninth year, and the other day we heard it said the Fellows elected the youngest man they could find for the secretaryship when our beloved friend Potter died. (Applause.)

THE PRESIDENT.—Nominations for Treasurer.

DR. HUMISTON.—I nominate Dr. Hayd to succeed himself.

DR. BONIFIELD.—I second the nomination and move that the rules be suspended and the Secretary instructed to cast the ballot of the Association for Dr. Hayd.

Seconded and carried.

The Secretary cast the ballot as instructed and Dr. Hayd was declared duly elected Treasurer.

The following were nominated and elected members of the Executive Council: Dr. Charles N. Smith, Toledo, Ohio, and Dr. Hugo O. Pantzer, Indianapolis, Indiana.

THE PRESIDENT.—Nominations, suggestions and invitations are in order for the selection of the next place of meeting.

DR. CHARLES A. STILLWAGEN.—Dr. Werder was going to extend an invitation to the Association to hold its next meeting in Pittsburgh, but he has transferred that pleasure to me, and I cordially invite you to select Pittsburgh as the next place of meeting.

DR. EMERY MARVEL.—I move that Pittsburgh be selected as the next meeting place.

Seconded and carried.

It was moved and seconded that the date of next meeting be September 21, 22 and 23, 1915. Carried.

DR. HUGO O. PANTZER.—We have audited the books of the Secretary and Treasurer and have found them correct and kept in excellent condition.

DR. CARSTENS.—I move the report of the Auditing Committee be accepted.

Seconded and carried.

THE PRESIDENT.—That concludes the business of the Executive Session. A motion to adjourn is in order.

It was moved and seconded that the executive session adjourn. Carried.

E. GUSTAV ZINKE, M. D., *Secretary.*

PAPERS

READ AT THE

TWENTY-SEVENTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

HELD AT

HOTEL IROQUOIS

BUFFALO, N. Y.

SEPTEMBER 15, 16 AND 17, 1914

THE NECESSITY OF CONSTANTLY LOOKING FOR CANCER OF THE UTERUS.

BY

J. H. CARSTENS, M. D., F. A. C. S.,

Professor of Abdominal and Pelvic Surgery, Detroit College of Medicine and Surgery, Detroit, Mich.

(With two illustrations.)

CANCER is increasing at a terrible rate. It does not seem that a more careful diagnosis is the cause of the statistics showing more cancer now than formerly. I well remember how we made the diagnosis of cancer of the abdominal organs, for instance, of the stomach, liver and intestines, without postmortem or microscopical examination, and do not think that we erred any more then than now. If my contention is right, it certainly behooves us to be especially careful in the early diagnosis.

In the present state of our knowledge we can do little for our patients, unless we make the diagnosis when the disease is still circumscribed and when it can be eradicated with the knife. Knowing absolutely nothing of the cause of cancer, nor of remedial agents that will stop its development or cure the disease, we must depend upon surgery in the early stages. It is claimed that irritation is one of the causes, but I have always held that irritation has nothing to do with it directly. The parts of the system of certain individuals, subject to most constant irritation, are never affected by cancer; still, I grant, that parts irritated have an aberrant circulation and that the latter may facilitate the development or deposit of cancer. Nor do I want to discourage the removal of all irritants, little ulcers, warts, nevi, etc.

What I plead for is that we should be constantly on the look-out for cancer and suspect it in every case of uterine disease. If one woman out of eight dies of cancer, it certainly behooves us to be on the alert. It disgusts me to see and to hear of curetting in these cases. Women are curetted, no matter for what purpose, they recover from the operation, pay their bills, and that is the end of it. *The tissues removed are thrown away*, and that is the end of it. Now, this to me is a *most vicious thing*. Every general practitioner uses the curet, but few take the pains to examine carefully the tissue removed under the microscope for the purpose of determining the

pathological character of the scraping. No matter whether the curetting be done for a supposed miscarriage, for an excessive hemorrhage, or for an irritating discharge, or whether it is done in an old or in a young woman, in *every case a microscopic examination should be made to ascertain the absence or presence of cancer.* You may not find it often; but when you do, you may be able to save a life. In quite a few cases, I have removed the so-called "plug" when operating for lacerated cervix, and found cancer. Removing the uterus a week or ten days later, the most careful

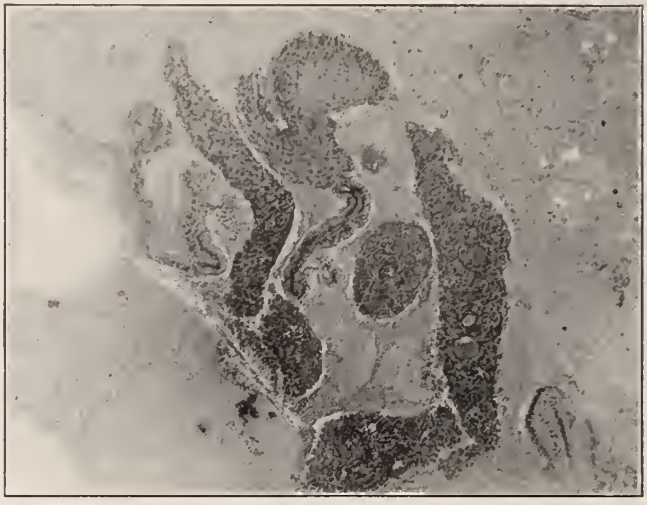

FIG. 1.—Microphotograph of the curettings of the case of Mrs. S.

search would find no cancer cells; so I really removed the uterus when it was not necessary. But such cases are quite rare. In most of the cases you find cancer cells somewhere else, which would soon develop to a degree beyond the ability of cure. The same conditions we observe sometimes after curetting followed by cauterization with some powerful caustic, like zinc chloride or nitric acid. The "curetting" may reveal malignancy but none may be found in the uterus removed a short time afterward. This proves that we can, occasionally, remove all the cancerous tissue by comparatively simple means, if an early diagnosis is made.

I have written and talked on this subject until it is considered a hobby of mine. I submit to this unjust stigmatization, but I consider the question of uterine cancer so vital that I shall continue to talk and write on this subject until every general practitioner is

aroused to a sense of full realization of this terrible state of affairs, and until he, like myself, is accused of having cancer on the brain.

We have always talked about the cancer age as ranging from thirty-five to forty years and upward. We now know it may occur much earlier, indeed at any time of life. During the last few years, I have seen quite a few women at twenty-three, twenty-five, twenty-seven and twenty-eight years, having cancer of the uterus. In fact, I have had one case not yet twenty-one, who had cancer of

FIG. 2.—Microphotograph of the section of the uterus removed, from the case of Mrs. S.

the womb, and when I saw her the first time she was hopelessly lost to the disease. It makes our hearts ache to see a young woman, just married, with such a terrible disease.

As an example, I will cite one case and show you the pictures.

Mrs. S., aged forty, no children, history good, has had a disagreeable irritating vaginal discharge for some months, and has been treated by douches and local applications. I suggested a curetting. She went to Harper Hospital. I curetted her, and removed but little tissue. There really seemed little the matter with the mucous membrane. I had the scrapings examined by Dr. Plinn F. Morse, our pathologist, who pronounced the disease cancerous. I had her returned to the hospital ten days later and removed the uterus. Dr. Morse examined the organ carefully and, at first, he could not find any cancer cells; all at once he found a little nest of which I have here a microphotograph. This case shows beautifully how we

can make the diagnosis easily and save the woman's life simply by being constantly on the lookout for this disease.

In conclusion I would say:

First.—In every case of curetting the tissue removed should be carefully examined. If for miscarriage, examine for placental tissue, and *beginning of deciduoma malignum.*

Second.—If curetting is done for hemorrhage you want to know if the hemorrhage is due to disease of the mucous membrane, or other conditions of the uterus or of the body in general. If curetting is done for an irritating discharge, you want to know the pathologic changes in the mucous glands. In fact, the main thing is *that you want to know.*

Third.—In every case of curetting the tissue removed must be carefully examined microscopically. In every case of trachelorrhaphy the tissue removed should be examined in the same way for cancer.

Fourth.—The age of the patient is of no importance, old or young; all tissues removed should be subject to the same careful microscopic examination.

DISCUSSION.

Dr. Julius H. Jacobson, Toledo, Ohio.—I hope Dr. Carstens will keep up his efforts of impressing upon the medical profession, and women's clubs especially, the importance of the early recognition of cancer of the uterus. I am sure, this is one of the great problems which we as gynecologists have to solve. I am reminded of a similar movement which was systematically carried out a few years ago in Germany. Midwives and nurses were instructed in the early symptoms of cancer of the uterus. It has always seemed to me that if we would impress and teach the nurses in the hospital training schools regarding the symptoms and importance of the early recognition of all forms of cancer, we would accomplish much toward informing women of the early signs of this disease. It is a common experience with every surgeon to have women come to him when the cancer is so far advanced that nothing can be done. There is much confusion in the minds of gynecologists and surgeons throughout the country regarding the curability of cancer of the uterus. Opinions vary from those of extreme pessimism to those of extreme optimism. Cancer of the uterus can be cured by timely and thorough operation, in a much larger per cent. of the cases than is generally supposed.

There are three forms of cancer, cancer of the cervical canal, cancer of the vaginal portion of the cervix, and cancer of the body, each variety having different degrees of malignancy. The least malignant of all such cancers is that of the fundus of the uterus, which may be classed as the second most favorable cancer (cancer of the larynx being the most favorable). Cancer of the body can be cured in more than 75

per cent. of the cases by an early hysterectomy. On the other hand, there is cancer of the cervical canal, the most malignant of all uterine cancers, this form you cannot cure by a simple operation, a most radical operation is here necessary. Cancer of the vaginal portion of the cervix, in its relative malignancy stands between the above two forms. The lack of a proper understanding of the relative malignancy of these three forms of uterine cancer, has led to the confusion regarding its curability by means of the cautery, as recommended by Bryne and others. In reference to the early diagnosis, cervical induration or thickening is most important. If we feel an abnormal induration we can remove a piece of it and subject it to microscopic examination. Cancer of the body although least malignant, is more difficult to diagnose early because the growth is not visible, and the symptoms are more or less masked. The principal symptom here is usually hemorrhage. The uterine curet with a routine microscopical examination of scrapings will make the diagnosis early for us in such cases. At the Providence meeting of this association, I reported a case in which hysterotomy failed to reveal a beginning cancer.

Dr. Channing W. Barrett, Chicago.—In visiting Detroit some months ago I had the opportunity of seeing the Harper Hospital Laboratory. We were studying interesting specimens and this one was shown me. It emphasizes the necessity of examining a good many slides because the first slides did not show cancer, as Dr. Carstens has stated, and then finally a slide that showed these carcinomatous nests was found.

This paper emphasizes not only the great necessity of early diagnosis of cancer, but the absolute need of having such an arrangement as Harper Hospital has at the present time, namely, a trained pathologist in connection with the surgical work so that all tissue may be examined.

I would not be quite inclined from the viewpoint of development of carcinoma in places of irritation such as carcinoma of the lip or carcinoma of the pylorus or cervix, to lay as little stress as Dr. Carstens did upon the point of irritation as an etiologic factor. We will probably find out some time that there is another cause, perhaps a parasitic cause, but as yet it cannot be doubted, it seems to me, that irritation does play a rather important rôle.

Dr. Frank D. Gray, Jersey City, New Jersey.—I wish to request Dr. Carstens in closing the discussion to elucidate a remark which he made with reference to this matter of irritation. If I understood him rightly he stated that the portions of the body most subject to irritation were the least subject to the development of cancer. I want him to explain that point in full.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—Dr. Deaver and myself stand alone in exploiting the value of diagnostic hysterotomy. Dr. Carstens spoke of the pathologist finding cancer cells and of making the diagnosis. How many times have we, in trusting our pathologists, have a report sent back to the effect "nothing found," and afterward have discovered carcinoma?

I agree with Dr. Carstens that we should make the diagnosis early if possible, and I do not see any reason why, when we are suspicious and when the clinical and pathological proof is wanting, we cannot bring the fundus down into the vagina, split it, and examine the interior of the uterus, and remove a piece, if necessary, instead of relying too much on the curettings.

Dr. Charles L. Bonifield, Cincinnati, Ohio.—The importance of the early diagnosis of cancer cannot be exaggerated, and although there is some question as to the advisability of teaching the laity the symptoms of cancer or anything else, yet some good may come from it. The average woman has dread enough of cancer. Jerome K. Jerome said that after reading a medical text-book he had everything described in it except housemaid's knee.

I believe that was very much the case with most of us when we began the study of medicine. I do not think it is wise to keep harping on the symptoms of cancer to the laity themselves because they cannot make the diagnosis under any circumstances. But what is necessary is to teach married women who have had children the necessity of going to a gynecologist occasionally to be examined just as we go to a dentist to have him see whether our teeth are sound or decayed. If it is worth while to pay money to save teeth, it is equally worth while to have some competent person to determine whether or not a woman is suffering from cancer.

The value of curetted scrapings depends upon how thoroughly the scraping has been done and how many slides a man makes. It is easy to overlook cancer. No gynecologist of experience would think, if bleeding persisted after curettage, of not investigating further. Personally, it is seldom I explore the uterus either by finger or by sight to make a diagnosis.

Dr. Carstens (closing).—My paper was written largely for the benefit of the general practitioner. I need not emphasize what I have said to the members of this Association. I simply wanted to again stir up the members, so that when they go home they will point out to the general practitioner the importance of not throwing away the curetted material and say that is the end of it. When you curet or operate for a lacerated cervix the tissue should be carefully investigated to see whether or not it is cancerous, and the point I tried to bring out was you can find cancer when a woman is twenty-one or twenty-five and not only when over forty years of age, and it is not only necessary to do it after forty, or the so-called cancer age, but earlier. You must look for the disease earlier than you do now.

My friends Dr. Deaver and Dr. Dickinson can split the uterus all they like for the purpose of making a diagnosis, and yet they may never find cancer by looking at it. In the case I reported there was a good seemingly healthy uterus and everybody thought so who saw it. I was accused of removing a healthy uterus, but it was cancerous just the same.

As far as irritation is concerned, I mentioned that as a kind of bait, thinking somebody would bite, and my friend Barrett and some of

the other gentlemen did bite. *Irritation does not produce cancer, never can, and never will.* If by coincidence there is a place that is irritated and cancer develops, there is some other place where cancer developed where irritation does not exist. I will tell you where there is irritation. You will see men wearing glasses whose noses are irritated, or the skin of the nose is irritated, it is pinched, and I challenge anybody to show me a single case of cancer that started in such a place. I do not know how many men wear trusses in this country or all over the world, but if there is any place that is irritated it is that place where a truss is applied. It has got to be very tight to the skin to hold the hernia in place. The skin is constantly irritated and yet nobody has seen cancer develop at such a point.

There are lots of people who have corns, and if there is anything that is irritated it is the little toe, and toes are irritated and irritated and yet cancer does not develop in them. Did anybody ever see a cancer develop in a toe from irritation? I think I have clearly shown that irritation has nothing to do with the development of cancer. There is *something back of all that* that causes cancer, and let us get away from the idea that it is irritation.

ABDOMINAL DISTENTION FOLLOWING OPERATIONS UPON THE PELVIC VISCERA.

BY

FRANCIS REDER, M. D., F. A. C. S.,

St. Louis, Mo.

THE subject I have chosen is rather commonplace. In presenting it, I may offer the excuse that it has been my aim to make the immediate postoperative period for my patients as comfortable as possible. The distress caused by abdominal distention in patients subjected to laparotomy is often such that some measure for relief must be instituted. It is not uncommon to hear a patient, who is to undergo a laparotomy, ask the question: "Doctor, am I going to suffer much with gas pains?" The laity seems to be fairly well informed on this point. My efforts to bring about a comfortable convalescence after a laparotomy have been somewhat disappointing. The greater number of patients (about 65 per cent. is a fair estimate) have given evidence of abdominal distention with resultant pain that demanded measures for relief. Some patients suffered more than others. In some the distress was of short duration, while in others it was prolonged into a period of marked exhaustion.

In former years I attributed this condition to the improper preoperative care of the patient, and to a lack in surgical proficiency. During later years, however, when no doubt could any longer be entertained as to the proper preoperative care of the patient, and when an increased amount of work, together with better opportunities, made it possible to master certain shortcomings in the surgical technic, I find that but little has been added to the comfort of the patient who has been subjected to a pelvic operation.

It may be stated here that not only does this abdominal distress follow pelvic work, but it may also manifest itself in any and all abdominal operations, even including operations on the kidneys, which are extraabdominal organs. The surprising feature of this abdominal distention is that it may manifest itself with the greatest discomfort in an operation of a lesser magnitude, whereas in an operation of greater magnitude, and where such distress might be expected, the postoperative period may be surprisingly free from this phenomenon.

Abdominal distention immediately following an operation often

receives but a passing notice from the surgeon. There may be conditions, however, when abdominal distention may assume such proportions as to become a serious matter, and strenuously tax the diagnostic ability of the surgeon as to the correctness of his diagnosis.

Can an uncomplicated abdominal distention following a laparotomy menace the life of a patient?

When the factors at work are fully taken into consideration, this question must be answered in the affirmative. In any event, the condition must be looked upon at all times as sufficiently serious to demand immediate measures for relief. Unless such measures are successful, the patient is in great danger of perishing from toxemia or exhaustion.

It has been a debatable point with me how to properly designate an abdominal distention immediately following a laparotomy, so that its gravity may be more fully appreciated. Paralytic ileus appeals to me as appropriate, because it carries with itself the more serious meaning of the word "ileus." The cause of paralytic ileus, as we meet with it most frequently clinically, is the result of peritoneal trauma. A septic condition is also a common factor; it is, however, not the object of this paper to embody the infection ileus in this argument.

When we say that the cause of paralytic ileus is due to peritoneal trauma, what do we mean? We simply mean that the insult the peritoneum has been subjected to operatively has shown itself in a reflected action upon the small intestine through its delicate sympathetic nervous system, principally through the nerve cells in the plexuses of Auerbach and Meissner. If the trauma to the peritoneum has been gross and extensive, reflexes of an intense character, with their concomitant sequelæ, may be engendered.

How is such a trauma usually inflicted? The invasion of the abdominal cavity invariably means injury of some sort and in some manner to the peritoneum. The surgeon consoles himself that with utmost gentleness in his manipulations of all visceral organs, with sharp dissections and with an acute precision in reaching his objective points, he will be able to minimize the dreaded abuse to the sympathetic nervous system. A pelvic operation, however, is not infrequently one of great magnitude, and the invasion often one of great severity. Gross manipulations may become imperative, carrying with themselves a trauma with the resultant paralytic ileus. The danger that lurks in the so-called "spreaders," so often used to keep the abdominal walls retracted during an operation for an hour or more, can well be determined during convalescence. The packing

away of the intestines with swabs of gauze, or with towels, no matter how gently performed, is always an irritating process, it is a minute trauma. The freeing of adhesions either with the gloved hand, or with gauze, is a serious trauma to the peritoneum.

The severe handling of the mesentery, the ligation of a pedicle, the application of a mass ligature, and the placing of sutures add their quota of injury to the peritoneum. Finally, should the patient's condition, on account of oozing from a denuded surface, demand a gauze packing, we introduce into the abdominal cavity one of the greatest factors responsible for a peritoneal trauma.

The influence transmitted to the intestinal tract by these intrapelvic manipulations is purely reflex in nature, having in its wake either a complete cessation or a partial inhibition of the motor power. Small segments of the intestine may be involved in the paralysis, or the whole of the small bowel may be greatly distended and filled with fluids and with gases. When such a condition exists, neither feces nor flatus are passed. If an enema be administered to such a patient, it is often retained, or is returned with little force and without result in flatus or feces, except perhaps such as may be washed mechanically from the rectum. When we reflect how complicated and extensive the mechanism of intestinal peristalsis is, consisting of a complex neuromuscular apparatus with a large vascular supply, and requiring for its production the integrity of the whole muscular and nervous apparatus of the intestine, it can be readily appreciated how coils of small intestine in a state of marked distention can readily throw this mechanism out of gear. Should such a condition not subside or fail to be relieved, an aggravation of the existing distress ensues, and a toxemia results. This toxemia is the result of stasis of the intestinal contents. Such contents not only consist of the food taken, which is usually very little, but also of the secretion of the various digestive glands. As an instance of the amount of glandular secretion that finds its way into the intestinal tract, it can be said that the salivary secretion alone amounts to one to two pints in twenty-four hours. When there is added to this the secretion of the gastric, biliary, pancreatic and intestinal glands, it can be appreciated how readily a flooded state of the intestines can be brought about.

A stagnant state caused by the arrested peristalsis becomes still more aggravated, because the normal process of absorption of the liquid is interfered with, none of the fluids, on account of the inhibited power of the intestine, being able to reach that part of the bowel where this physiological process takes place.

In the presence of such an inviting pabulum, the invasion of hos-

tile bacteria becomes a matter of a very short time. Myriads of proteolytic, anerobic and endogenous microorganisms harbored in the intestinal tract act upon food products, especially the proteins, amino-bodies and the resultants of a faulty metabolism, forming toxic products known as indol, phenol, skatol, osmotic oxyacids, paracresol compounds, hydrogen disulphide, acetone and diacetic acid. These poisons have a deleterious effect upon the peripheral nerves of the intestine, causing a paralysis in severity conforming to the portion of bowel involved, and to the virulency of the bacterial flora that are present. Should there be no favorable influence at work at this stage to antagonize the further invasion of hostile bacteria, the paralytic ileus will become more progressive. The distended and lengthened intestines, which have been forced into folds, will find it difficult to overcome their angulations; the sudden rise of intra-abdominal tension will interfere with the circulation, and the gases will no longer be absorbed from the intestinal lumen.

As a secondary result of interference with the circulation, a diffuse paralysis caused by the poisoning of the neuromuscular apparatus with toxins found in the stagnant contents will end in marked distension of the gut. We are here approaching a very critical stage of this clinical picture. Assuming that the bowel distension has been progressive, with absolute constipation lasting about five days, it can be expected that the cardiac and respiratory functions will begin to show marked embarrassment. It is very evident that under the strain of the pent-up gas the muscular wall of the intestine is being thinned out, thus robbing it of much of its resisting power. The lowered vital tension can no longer act as a barrier to the hostile microorganisms, and they are free to pass from the lumen of the exhausted intestine through the wall to the peritoneum, giving rise to the most grave postoperative sequelæ, peritonitis and infection.

The recognition of a paralytic ileus does not present any difficulties. It is only when the factors at work seem progressive with apparently no relief in sight, that a feeling of doubt may obsess the surgeon whether or not the condition might be one of mechanical ileus. A careful observation of symptoms and physical signs made from the hour of operation will be of much value in aiding the surgeon in the correct interpretation of the existing condition.

The onset is gradual and usually manifests itself within the first twenty-four hours after the operation. There is absolute constipation. The patient shows marked restlessness and complains of pain in the abdomen. This pain is diffuse and has the characteristics of an old-fashioned wind colic, being cramplike, twisting or binding. At

first, it only gives rise to periods of discomfort, associated with the rumbling of wind which will not pass downward. Later on definite attacks of colic occur, and these become more frequent and more severe. At times, the pain is intense, causing the patient to place his hands upon his abdomen and cry out. He makes an effort to expel the flatus, but is unable to do so, excepting the small quantities of gas that have been forced into the large bowel by pressure.

Palpation of the abdomen reveals a uniform distention with the abdominal muscles more or less on the defensive. There is usually an elevation of temperature of 100° and a fraction, with an accelerated pulse, from 110 to 120. At the onset the general condition of the patient appears good. As the distention becomes progressive, the patient's mental anxiety is depicted upon his face, it assumes a worn and worried look, not unlike the facies abdominalis in the more severe abdominal lesions.

In connection with the symptomatology of this condition, I wish to specially allude to vomiting following a laparotomy. It has often been a question with me when the vomiting that can be wholly ascribed to a properly administered anesthetic should cease.

Of course, the temperamental state of the patient, the amount of anesthetic used, etc., are factors to be reckoned with.

It can be assumed that vomiting, which has persisted for twenty-four hours after a laparotomy, can be attributed to some other irritating factor than that of the anesthetic, especially so when there is evidence of abdominal distention, and the character of the vomitus has changed from the bilious to a foul-smelling fluid. The nature of such vomiting must be looked upon as one of reflex irritation, a reflex phenomenon of the sympathetic nervous system, causing a regurgitation of intestinal contents to the stomach. Nausea and severe retching may usher in vomiting in paralytic ileus. However, as long as the patient can remain quiet and is not given any fluids, the less will be the vomiting, though the patient may feel sick. It has been my observation that when a patient vomits frequently and with ease, *i.e.*, brings up a mouthful of dark-colored, foul-smelling fluid without any exertion, the condition of that patient is serious, even though no other symptoms of an apparently alarming nature may be present at the time.

The prognosis of an adynamic ileus is the most favorable of all immediate postoperative complications. It is the persistency of the symptoms with the increased distress of the patient, and the inability to establish a bowel movement at a time when physiological conditions demand the relief of the alimentary tract, that the situation

becomes at all alarming. The patient, as a rule, is relieved of his abdominal distention within five days. It may happen, however, that the measures for relief fail and that death may ensue from a toxemia or from exhaustion.

Much can be said relative to the treatment of a paralytic ileus, but still more can be said relative to the prophylactic measures, which, when properly carried out, will do much to mitigate this distressing condition. The careful preparation of a patient for abdominal section is not to be underestimated. Patients with surgical lesions of an acute nature, where operative measures must be immediate, are an exception. With a patient, however, where the lesion is not acute, a preparatory treatment of at least a week is desirable. The preparatory treatment is purely hygienic in nature, with special attention to diet and to the organs of elimination.

It is to the surgeon who performs the abdominal section that we look for the comfort of our patient. If the operator is rough in the handling of the organs, if he exposes the intestines without the proper protection, tears and pulls at adhesions, with a surgical execution of the slam-bang type, then almost anything may be expected during the postoperative period. When the surgeon, however, exercises that delicacy and gentleness of touch in his work that human organs and tissues should be accorded, if he exposes only that portion of the intestinal tract which is necessary, and keeps the exposed coils covered with a gauze pad moistened in warm saline solution, if his dissections are made with precision and with the least amount of mutilation of the tissues, his hemostasis that of a finished surgeon, such a patient is being given every possible chance for a comfortable postoperative convalescence.

It appears to me that a paralytic ileus could to some degree be anticipated, viz., a stomach lavage given before the patient is removed from the operating room. This is especially indicated when the operation has consumed considerable time with the patient in the Trendelenburg position; twenty-four hours after the operation the administration of calomel with a liberal quantity of bicarbonate of soda, and a fraction of pulv. opii, to be followed twelve hours later with a saline draught and a stimulating enema, may establish an active peristalsis with the resultant bowel movement and the expulsion of the pent up flatus. When such a happy condition is once established, the patient's convalescence will not be harassed by gas pains of any severity. Gas pains of a mild nature, however, may manifest themselves at intervals. If the condition is one which has progressed to an extreme paralytic ileus and the measures just men-

tioned have failed to produce a bowel movement, or the expulsion of an appreciable amount of gas, it becomes imperative that a systematic régime in the hands of a competent nurse be instituted and continued till results are obtained. The administration of purgatives, although not contraindicated in the full sense of the word, will be of little avail because the patient in most instances will not retain them.

The most encouraging measures at our disposal are embodied in the stomach lavage and in the enema. The former should be used every four to six hours while the patient continues to vomit, whereas, for the latter, it may be said that our greatest hope rests here. Fortunately, disappointments have been few. In my hands, the alum enema, as advised by Hardon, slowly introduced into the rectum every two hours, if necessary, has proven so efficacious that I have given it the preference over all enemata. It must be borne in mind, however, that the alum enema is only given to remove the flatus, and that it may require several days of persistent work to accomplish this. Fortunately, the alum is not irritating to the bowel, so that a large number can be administered provided the nurse exercises gentleness.

While awaiting results from the alum enemata, it is well during the interim to occasionally administer a stimulating enema of soap suds with the addition of turpentine. This enema should be introduced as high into the bowel as possible, and the quantity at least a pint. A stimulating enema should not be repeated too often on account of the severe tenesmus it may cause. An enema of olive oil with an admixture of glycerin, or one of magnesium sulphate solution prove excellent substitutes. Of drug medication hypodermically administered, especially of eserin salicylate, and pituitrin, I cannot say that they have given me sufficient encouragement in the treatment of intestinal paresis to feel at all positive of their efficacy. There have been instances where flatus was expelled in enormous quantities after eserin had been administered. This, however, happened in connection with the alum enema régime, making it difficult to correctly judge the action of the drug.

With the administration of pituitrin, I have had a similar experience, this drug also having been given in connection with the alum enema. My experience with pituitrin has been limited to eight cases. It may be said, however, that its administration has favorably influenced the vomiting in five of the eight patients.

Two remedies whose therapeutic values must not be underestimated in combating a paralytic ileus are strychnia and codein.

Through their judicious administration, the exhausted organism is often given renewed tone and strength, factors highly essential in overcoming so nagging a condition as an abdominal distention following a pelvic operation.

DISCUSSION.

Dr. Hugo O. Pantzer, Indianapolis.—The importance of the subject presented by Dr. Reder is apparent. I wish not to detract any from the statements and practices narrated by the essayist. Postoperative distention with me is practically ruled out. Faulty use of adhesive straps is the cause of a great number of these cases. A light touch of the abdomen, saying nothing of a painful one, causes the underlying parietal musculature to contract; and this in turn affects the underlying intestines. Adhesive straps put on too tightly, or slantingly so as to pinch the skin, or put away around the abdomen, result in compression and spastic contraction of the intestines immediately underlying such pressure. When morphine is used in an effort to relieve gas pains and distention so created, the distention is increased, paralyzing the intestinal musculature. The interrelation between the offensive adhesive strapping and the gas pains is easily demonstrated. Loosen the offensive straps and the patient will report relief at once. In single instances, gentle massage of that part, or of the entire abdomen, or when necessary turning patient in bed, to the right, and back, and to the left and back, will commonly suffice to shift the gases and give relief. A pint of salt water is given by enema every hour, as I have no doubt many surgeons nowadays are giving. The drop method should not be resorted to in cases tending to intestinal distention. It fails of the desired gentle stimulation of peristalsis. If the douche-bag is placed 5 or 6 inches above the nozzle in the rectum, the force is sufficient to produce a gentle stimulation of the mucosa; enough to wean down gently gases and fecal matter and not enough to unfit the rectum for the retention of the fluids. Whenever the patient complaint of distress the enema is discontinued for the while, and the patient told to evacuate. Where this effort of the patient fails, a low Watkins enema is given. Within fifteen minutes after gases or feces are discharged, the nutritive enema is resumed. If the distention does not yield to these remedies, physostigmin or pituitrin hypodermically is given, followed by low Watkins within fifteen to thirty minutes. For the later stages, podophyllin has served me well. Given in 1/10-grain doses, three times daily, it commonly keeps the bowels nicely open and the secretions stimulated. These procedures methodically carried out from the first, anticipate and obviate distention.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—All roads lead to London, some quicker than others. That adhesive strapping promotes gas pains I can hardly believe, because I have used adhesive strapping dressings for a number of years and very rarely had gas pains following. The so-called gas pains are generally produced

with the traumatism of one's hand and not with the traumatism of the apparatus upon the abdomen. In my cases of instrumental surgery my intern says, "I was not up last night with that patient." In some cases, like inflammatory cases, I may have to use the hand and manipulate, and my patient may have gas pains, and my intern has to get out of bed during the night. For the relief of these pains we give pituitrin and give it promptly and expect relief right away. We may not only have evacuation of the bowels but of urine. If the thing continues, there is one thing that has not been spoken of in any of our societies, and that is the use of the Kemp tube. There is nothing more reliable than water at 120° as it passes into the rectum, keeping up the heat by a hot-water bag held over the tube and running it for at least twenty minutes. You can activate the bowel, the kidney and skin, and consequently promote sleep. Sometimes I turn these patients over on their stomachs as I would a baby and have general compression which gives relief.

Dr. Frank D. Gray, Jersey City.—I would like to emphasize what Dr. Dickinson has said in regard to the efficiency of the Kemp tube at intervals. I have had practically the same experience he relates. I would like also to suggest another form of enema which has not been mentioned, and which I have found very effective in cases of abdominal distention. It is not original at all with me; it was original with the elder Senn, and that is milk and molasses, a pint each. It is very effective in reducing distention.

I would go a little further in regard to the use of pituitrin and would give it as a prophylactic before we have gas pains. I usually administer it in doses of 1 c.c., two or three times a day, to those patients immediately after operation for two or three days. It is very effective in preventing gas pains.

There is one point I wish to make in regard to the type of ileus in these cases. It is a question if they are always cases of paralytic ileus. We lose sight of the possibility of spastic ileus. I have operated on two cases within the last two years with great distention, with all the symptomatology of intestinal obstruction, expecting to find an organic obstruction. In both cases I found nothing pathologic except spastic contraction of certain areas of the ileum. In one case there was a spastically contracted gut about 18 inches in length, the size of my little finger, and in the other case, instead of it being a continuous spastic contraction, it was a series of several contractures each about 4 or 5 inches long. Both of these patients made uneventful recoveries.

Dr. William E. Darnall, Atlantic City, New Jersey.—I have often wondered just how much effect a nervous temperament has to do with abdominal distention. I quite agree with what Dr. Reder has said in his valuable paper and with the other gentlemen who have spoken; but we surgeons are so in the habit of looking for the tangible things we sometimes forget the other side—the psychological. I do not doubt the experience of every one of you gentlem n has been the same as mine. Oftentimes when we take a phlegmatic ward patient and do an extensive Werder operation or Wertheim

or something of that sort, we are surprised at how very little distention the patient gets. The patient is comfortable the next day. On the other hand, if we take the high-strung, nervous society woman, of neurotic type, she is frightened to death, and in a state of terror when she goes to the hospital. The operation may be a very simple one where you have not used any trauma or had to pack off the intestines, but the next day you find her all ballooned up with gas, crying and hysterical. The operation has probably been the simplest kind you could do. Just how much effect the neurotic temperament has in distending that intestine I do not know. It is a thing I have observed quite frequently, and what I have said is only in the nature of a suggestion.

Dr. John Norval Bell, Detroit, Michigan.—I admit that I have had trouble with dilatation of the stomach and with gas pains after abdominal Cesarean section work, as I think most of you have. I have used pituitrin in three cases and my patients have had a less stormy convalescence since I have used it.

The point brought out by Dr. Gray of using pituitrin as a prophylactic might apply in the average abdominal work, but in Cesarean section we must bear in mind we may kill the baby by using pituitrin too soon. I used pituitrin in one case when I started to operate; the uterus was markedly pallid and white, so there is danger of shutting off the circulation and killing the baby if you use it too soon.

Dr. Robert T. Morris, New York City.—We have to go at this matter in a fundamental way and realize the relationship between tonic ileus and atonic, and place them both upon the basis of splanchnic influence. You have first a toxic overstimulation of the splanchnics, then you have tonic ileus; then exhaustion of muscularis and atonic distention.

In regard to the treatment of the latter condition, I quite agree with Dr. Dickinson and Dr. Gray as to the value of the Kemp tube and massage and posture. They said little of posture, but if we place the patient upon the abdomen, we get distinct mechanical value. Improvement may sometimes be noted in fifteen minutes. The use of Kemp's tube and massage is very important, and at other times the old alum enema that most of us have forgotten is of value. An ounce of alum to the quart of water gives a rapid exudation of secretion from the mucous surface of the bowel very much as alum placed in the mouth causes a rapid action of the parotid glands or the secreting glands in that vicinity. These points I believe are practical as we see them in everyday work.

Dr. J. Henry Carstens, Detroit.—I cannot agree with Dr. Pantzer about the strapping. I never sew up the skin, I plaster it together. I do not shove microorganisms under the skin into the wound, but strap it up tight, sewing up the fascia only with catgut. If I do not put plaster on there I cannot bandage it tight enough because some of our patients will dispose of catgut in three or four days, while in others it will stay in for two or three weeks. I do not have these troubles from distention unless I have sepsis. When I have a case of abdominal distention I know I have sepsis to deal

with, and if there is no sepsis I do not get distention. If there is distention, I may find a stitch abscess before I get through with the case.

Dr. Reder (closing).—I appreciate very much the interest that has been taken in the subject presented to you. I rather hesitated to bring this matter before the Association for fear I might be considered as looking at these conditions too seriously. As I have previously stated, the loss of two patients from what appeared to be an abdominal distention, the postmortem examination revealing nothing pathologic to which death might be ascribed, prompted me to present this subject. Strapping of the abdomen has been alluded to by Dr. Pantzer. I wish to state that in both instances the operation was a vaginal hysterectomy. No strapping of abdomen, of course, was necessary, there being no abdominal wound. If vomiting does not interfere with the taking of food, such as toast or crackers, this measure should be encouraged as soon after the operation as is consistent, that peristaltic action might be encouraged.

A REPORT OF THE END-RESULTS AFTER OPERATION IN 109 CASES OF DISPLACEMENT OF THE UTERUS, BLADDER AND RECTUM.

BY

H. A. WADE, M. D., F. A. C. S.,

Visiting Surgeon to the Bethany Deaconess Hospital and Visiting Gynecologist to the Williamsburgh Hospital,

Brooklyn, N. Y.

THE following report is based upon a review of 109 investigated cases of displacement of the pelvic viscera treated surgically, during the years 1912 and 1913 in my services at the Williamsburgh and Deaconess Hospitals. I have had a personal interview with, and have made a physical examination of, each one of the cases here reported at periods varying from six months to two years after the operation. In the majority of cases more than one examination was made. We have found that it is the prevailing position and relation of the body of the uterus to its cervix, and the prevailing position of the uterus in its relation to the viscera of the pelvis that should guide us in the making of a diagnosis.

Two general methods have been used in the correction of the displacements of the uterus, bladder and rectum. The correction has been made from above, or by the abdominal route, and from below, or by the vaginal route. By the abdominal route the body of the uterus has been placed in its proper position and relation with the other pelvic viscera and with its cervix by taking up the slack in the round and broad ligaments, or by suspending the posterior surface of the fundus of the uterus to the anterior abdominal wall. The correction by the vaginal route has been made by decreasing the size and weight of the uterus, and by decreasing the caliber of the vaginal canal. In both methods by elevating the uterus we also raise the bladder and rectum. In many of the cases here reported the correction was attempted by combining the two methods.

Replacement of the pelvic viscera by suspension has the following advantages: The operator can without any special training easily effect the desired replacement which in a certain proportion of cases is permanent. Pregnancy follows in a certain proportion of cases and of those a very large proportion have normal labor. The more simple the method of suspension, as in ventrosuspension, the

less the trauma; the greater the subsequent mobility of the uterus and the more likely a normal labor.

Among the disadvantages of replacement of the pelvic viscera from above or by the abdominal route are: in a large proportion of cases recurrence of the malposition occurs. Frequently the viscera remaining in their proper position after operation, there is no relief of the subjective symptoms. New subjective symptoms frequently develop after operation, as a result of inflammatory adhesions, the thickening of the capsule of the ovary, or to too acute an anteflexion of the body of the uterus upon the cervix. The question of mortality incident to section of the abdomen must also be considered. In over 300 abdominal sections for the correction of malpositioned pelvic viscera the writer had had one death.

Of the various methods of replacement of the uterus, bladder and rectum by the vaginal route the only one used in the 109 investigated cases reported in this paper is the special operation which the writer has devised and which he reported in detail in an article entitled "Description of a New Method of Repair for Vaginal Hernia with a Report of 140 Cases in which It Was Used," published in the *Medical Record*, Nov. 22, 1913.

The anatomical basis for this operation is as follows: Posterior versions, flexions and prolapses of the movable uterus and prolapses of bladder and rectum we consider as hernia. We have found, with but very few exceptions in these cases, upon making a vaginal examination, a laceration or relaxation of the levator fascia or muscle in the posterior vaginal wall and of the superficial fascia at the posterior aspect of the vaginal outlet. We have also found, upon making a vaginal examination in these cases, especially in cases of retroflexion and prolapse, a relatively large cervix as compared with the fundal portion of the uterus, the hypertrophied cervix corresponding to the sac in other forms of hernia. The enlargement of the cervix and relaxation of the muscle and fascia in the posterior vaginal wall also generally accompany posterior displacements and prolapses of the movable uterus in women who have never borne children, and in virgins.

In brief, the technic of the operation is as follows: The patient is placed in a lithotomy position. The cervix is thoroughly dilated and the interior of the uterus painted with a 50 per cent. solution, in alcohol, of tr. of iodine. No curetment is made of the uterus. If the cervix be hypertrophied as a result of trauma infection, or glandular congestion, the excessive portion of the cervix is removed, and the vaginal mucous membrane united with the

uterine mucous membrane with interrupted sutures of No. 2 chromic catgut. An incision is now made beginning at the lateral mucocutaneous junction of the posterior aspect of the vaginal outlet. The amount of tissue, that without too much tension, may be brought up to the urethra, is estimated, then the mucocutaneous junction at this point is grasped with a mouse-toothed forceps, and with slight traction a curved incision is made with a pair of scissors, the convexity directed toward the anus, extending to a point at the same level on the opposite side of the vaginal outlet. A flap of mucous membrane is now dissected upward and with a clamp held clear of the operative field. This flap is allowed to remain and acts as an umbrella to protect the plastic work done below from the irritating discharges above. By means of the gloved index-fingers the dissection is continued laterally until a firm fascial layer is made out. The layers of fascia and muscle are then brought together with a consinuous suture of No. 2 chromic catgut. The superficial fascia is similarly united with the same strand of catgut. The skin is distected free from the superficial fascia to the extent of one-eighth of an inch. This is particularly important, as without the dissection it will be frequently found impossible to bring the skin edges together. A clamp is now placed at the posterior angle of the skin incision and the wound is securely sealed with from four to seven Michel's clips. The clips are removed at the end of one week. If the clips are new ones and properly placed there should be no trauma from their pointed ends at the end of seven days, and there should be very little difficulty experienced in removing them.

The vaginal operation for the restoration to position of the pelvic viscera, has the following advantages: The uterus and with it the bladder and rectum are restored to their proper position in the pelvis without interfering with the mobility of the uterus. There is relief of the objective symptoms in a large proportion of cases, especially in cases of procidentia. There is no increase of subjective symptoms referable to the abdomen. The operation does not cause the body of the uterus to become flexed upon the cervix. Old tears of the posterior vaginal wall may be repaired by this method three days after the uterus has emptied itself after a full term of pregnancy or after an abortion. The repair holds during labor in a very large proportion of cases.

The vaginal operation has the following disadvantages: The patient often suffers pain at the posterior aspect of the vaginal outlet for some time after the operation, the pain being increased as the patient sits upon a hard surface. Coitus is sometimes painful after

the operation, especially if at the time of operation the denudation be carried up into the large labia. In some cases, especially in virgins, there is inadequate drainage for the uterine and vaginal secretions. In postpartum and postabortial cases there is danger of embolus following trauma to the engorged veins of the posterior vaginal wall.

In many of the cases reported in this series the replacement of the viscera of the pelvis was attempted by combining the two methods already mentioned, suspension from above, and support from below. In these cases it has been somewhat difficult to decide what benefit, if any, the patient derived from the suspension and what from the vaginal repair.

Following is a summary of the end results in the 109 cases investigated.

The body of the uterus was replaced to its proper position in the pelvis by the abdominal route combined with some sort of vaginal repair in sixty-one cases. Of these replacements, twenty-four were made by plication of the round and broad ligaments on the upper and anterior surface of the body of the uterus, according to the method of Coffey, combined with some form of repair of the cervix or of the vagina. The operation has been fairly satisfactory. In twenty-one cases the patient has had a restoration of the pelvic viscera to their proper position, and in twenty of the cases the patients felt an improvement after the operation Five became pregnant subsequently; one miscarried at the twenty-fourth week of her pregnancy; four went to term and were delivered vaginally of living children.

The uterus was suspended by plication of the round and broad ligaments without the aid of vaginal surgery in three cases. The uterus was movable and in place in two cases, and in two cases the patients felt improved after the operation. One became pregnant subsequently, carried her pregnancy to the twelfth week, and then aborted.

In this series of investigated cases the uterus was suspended from the anterior abdominal wall with No. 2 chromic catgut combined with some form of vaginal repair in thirty-three cases. Where the uterus was not freely movable and posteriorly displaced, or where the round ligaments were poorly developed, this simple method of suspension has been used. The uterus remained in its proper position in twenty-three cases. In twenty of the cases the patients felt some improvement after the operation; nine women became pregnant and eight were delivered of living babies; one died.

The uterus was suspended from the anterior abdominal wall without repair of the vaginal tract in seven cases. One became

pregnant; three felt better after the operation, and in five cases the uterus was in place and appeared to be movable.

The Baldy or Webster method of suspension was infrequently used. The large amount of trauma to the broad and round ligaments frequently giving rise to varicosities in the broad ligaments and the exposed position of the sutures on the top and back of the uterus often causing postoperative adhesions. Four of these suspensions combined with a repair of the vaginal canal were investigated. Two of the patients on examination showed the uterus movable and well placed, and two felt some improvement after the operation. None of the patients had become pregnant.

The vaginal method of supporting the uterus, and with it the bladder and rectum combined with the suspension from above, has been satisfactory to the patient in forty-two of the sixty-one cases examined. The uterus has remained in position and has been movable in fifty of the cases; fourteen of the patients became pregnant; two aborted; ten had normal deliveries, and two were delivered by the aid of forceps. Thirty-six of the patients had had the uterus supported by repair of the posterior vaginal wall without suspension; twenty-eight of these women felt improved after the operation, and in thirty cases the uterus was movable and in good position. The bladder in fifteen cases, in which it was involved in the procidentia, was placed in its proper position in the pelvis in nine cases. Eight of these women became pregnant after the operation.

The mobility of the uterus has never been interfered with when replacement was effected by support from below, and flexions of the body upon the cervix have not resulted from the operation. One death occurred which was probably due to cardiac embolism.

CONCLUSIONS.

1. Morbidity and not mortality should be considered in all operations for the correction of displacement of the pelvic viscera.

2. The morbidity will be less in replacements by the vaginal route than by the abdominal route.

3. The relative position of the body of the uterus to its cervix should be considered in the relief of symptoms and not the position of the uterus in its relation to the other viscera of the pelvis except in cases of marked procidentia.

4. A movable uterus out of place will give rise to fewer symptoms than a well placed uterus not freely movable, and a movable uterus that has been suspended will give rise to no untoward symptoms during labor

5. Old tears of the perineum may be repaired three days after labor or after abortion with assurance of success.

DISCUSSION

Dr. Albert Goldspohn, Chicago.—When this method of restoring the descended uterus by the vagina is pursued, as has been described by the essayist, the uterus will necessarily thereafter rest upon the pelvic floor continually. That is not a physiological condition. The uterus is intended in the absence of exercise of intra-abdominal pressure, as during defecation, etc., not to be in contact with the pelvic floor at all, but suspended by its own ligaments, pelvic fascia, etc.

It is necessary if the operation shall be complete to do more than that. We can shorten the sacrouterine folds if these are chiefly elongated and the cervix descends toward the vulva, then that is the principal indication; otherwise shortening the round ligaments is the only thing that is rational to correct the position of the uterus in its upward and anteroposterior position. While that can be done by the vagina, it is not the most advisable way of doing it, so that we need to do something, if my opinion is correct, from above to achieve the best results.

Coming to these operations from above, I am rather surprised in this day to hear a report about ventrosuspension. I had thought and almost believed that that was on the shelf. The essayist speaks of unsatisfactory results, and that there are too many recurrences of displacements. He has the reason right there. Ventrosuspension is a thing that I never practised and never believed in at any time. As to ventrofixation, yes in cases that could not conceive, but ventrosuspension never had an indication for me in any person whatever. The round ligaments, I taught for many years back, stand as the unanimous choice of modern gynecologists for that use. Whether they have any use otherwise physiologically in the unoperated woman or not, is altogether irrelevant. It is a pettyfogger that will allude to such an argument. If they have no use we can give them a use innocently and with most permanent good results. Of that I am just now in a position to speak. I have not said anything about my retroversion work for some years, but being requested to get ready to present the results of my work from two to more years back, for the forthcoming International Gynecological Congress next year, by the Secretary of that Congress, I have been working in conjunction with my paper here on resection of ovaries, and I am now not through with this investigation by far. But I have examined enough to know that the right use of the round ligaments is not only thoroughly innocent of all harm, but it does not prevent conception or embarrass labor, and what constitutes the clinching proof, is what I have in years gone by called "the double test for pregnancy," namely, that after labor retroversion does not return. That I can certify to by a series of examinations of about sixty made recently on women upon whom the operation was done seven years ago.

There is one single case of return of the retroversion, and that was due to a septic accident that happened in the hospital, and the uterus was out of place when she left; and she was reoperated. Aside from that, there is not one of any of these women who have any return of the retrodisplacement, and those who had children have even a more intensified shortening of the round ligaments. Their uteri are up more ideally than those who have not conceived.

I must give credit to the essayist for one admirable feature. He says, "I have examined all these patients." That is noble. When reports come in of such work to the effect that the patient wrote a letter or tells me so and so, or that she feels tip top, they cannot be considered as reliable evidence. It is simply hearsay evidence. We are before the court of science and we should be exact and truthful, not simply accept subjective reports, but insist on getting objective findings by examination and report the facts, whether good or bad.

Dr. Ross McPherson, New York City.—I have been very much interested in Dr. Wade's paper and I think one of the important things that should be considered in connection with the obstetrical part of this subject is the reason why so many women have retrodeviations after labor. It is not entirely a matter of unrepaired perineums, it is largely a matter of subinvolution and a heavy uterus, and the subinvolution is usually the fault of the obstetrician, who insists on getting the patient up too soon. There is developing a pernicious habit of getting people out of bed too soon and we get in this manner, and for this reason more retrodeviations than we would otherwise see. This is a point which deserves a great deal of consideration in the way of treatment as a matter of prophylaxis.

Regarding the repair of these lacerations, I have done the vaginal operation very much after the manner suggested by Dr. Wade for a considerable period, and it has given me great satisfaction, but I have not felt that the repair of the perineum and vaginal portion of the birth canal is the only thing to consider. It does not seem to me that there are many cases in which the combined operation is not the thing to do. The type of operation, whether you do a ventrosuspension, or the Webster-Baldy, or Coffey, or some other operation depends upon the condition you find. The operation of ventrosuspension should not be entirely relegated to the shelf. There are certain cases where it works nicely, but, on the other hand, we meet conditions where the round ligament operation can be very well done.

There has nothing been said about the old Alexander operation. In cases of movable uteri the Alexander operation gives surprisingly good results. On the other hand, if you are doing an intraabdominal operation and have to deal with poor round ligaments, you have not much left except a light suspension.

A word about suspension. There are so many people who do fixations when they intend to do suspensions. They grasp the uterus with tenacula, make four nice holes, put in number three chromicized catgut, hold the scarified uterus up against the peritoneum, and make a band of adhesions an inch wide which will undoubtedly be

an obstruction to future labor. If you treat the uterus gently as it should be treated, using plain catgut sutures and only a fine filmy adhesion, you can hold the uterus up until the congestion is reduced and normal conditions are reestablished; many times this operation can be done with great advantage.

In regard to the repair of old lacerations, three days after labor, I have had practically no experience. I have been afraid of it for the reason that I think involution of the vaginal tissues takes place pretty extensively, and I have never been able to make up my mind how much to repair or how much to let alone until such involution and return to normal has taken place. There is some danger due to excessive congestion of the posterior vaginal wall, which the essayist admits, and I feel that this procedure is not a particularly desirable thing to do. I do feel that the truest thing that can be said about retrodeviation of the uterus after labor is the fact that many women are getting up too early after operation and that these women should remain in bed much longer.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—Sometimes the general surgeon makes the best gynecologist, and for the replacement of descended or retroflexed uterus nothing has been said about the uterosacrals. Dr. Franklin H. Martin, of Chicago, in an article in the Journal of the American Medical Association, published an operation for prolapse and descensus of the uterus which seems to answer the purpose very well. You bring the fundus down into the vagina, you put some guy ropes through the uterosacral ligaments one-third, bring them through the parametrium close to the cervical and body portion of the uterus, and stitch them together anteriorly, then try cystic imbrication and cystic suspension and colorrhaphy, and so forth, and you have a condition which will hold and not give distress.

Dr. Emery Marvel, Atlantic City, New Jersey.—I am prompted to say a word in connection with Dr. Wade's fatal case, and to call attention to one of the evils in the procedure of ventrosuspension, and that is this: If the individual upon whom ventrosuspension is performed should be the host of spirochete infection, she is likely to get dangerous adhesions. The ventral suspension aims to secure adhesions, but there is an element in this special form of infection that produces extensive plastic exudate and adhesions when the peritoneum is traumatized. Intestinal obstruction is likely to follow and probably death.

Dr. Channing W. Barrett, Chicago.—Dr. Wade's classification of these conditions as hernia is entirely right. The question as to whether these hernias can be cured by an operation from above or an operation from below, or which one is the best, is untenable ground, because neither one of these procedures meets the conditions that should be met to cure the hernia. The operation from below gives the patient, if the operation is done well, a good pelvic floor which she needs to cure these conditions. It does not meet one of the other requirements of throwing the uterus out of line with the vagina, and a retrodisplaced and prolapsed uterus that is left in

line with the vagina will return. The hernia will continue. Another condition that must be met is to do away with redundancy of the anterior vaginal wall, so that it will not roll out over the best sort of pelvic floor that can be made. If we undertake to do this work from above only, we meet only a part of the requirement. We may temporarily throw the uterus out of line with the vagina, but where we undertake to make those ligaments that we shorten or create do the work that the pelvic floor should do, in a little time the uterus is down again. Four conditions must be met to cure that sort of hernia. The essayist has spoken of certain operations and none of these operations is new. Whatever operation may be chosen we must make a good pelvic floor, and we cannot do that without dealing with the levator ani muscle. We must get the vagina out of vertical line, we must have it set obliquely to the pelvic floor, and that is partially done by making a good pelvic floor, and partially by throwing the upper end of the vagina backward, which may be done by putting the fundus forward, or we may need to shorten the sacro-uterine ligaments according to the case. Next we must do away with the redundancy of the vagina and get the uterus out of line with the vagina, if the uterus is left. If the uterus is pathologic, it should be taken out, and the ligaments which normally support the uterus, should be attached to the upper end of the vagina. The procedures used were not the approved procedures of the present time. The trained gynecologist does not want to do a ventrosuspension operation, and that should be left out of consideration. The round ligament operations spoken of by the assayist were those that used the poorest part of the ligament to hold the uterus forward, and any sort of procedure that shows the percentage of evil results or poor results that this report furnishes is its own condemnation.

Dr. Frank D. Gray, Jersey City, New Jersey.—I am rather gratified that reference has been made to this pathological condition as a hernia. It justifies me, in a way, for my feeble thesis which I presented in joining this Society last year, calling this a "major pelvic hernia." Furthermore, there is one point which I made in that paper which has not been touched on here to-day. I recommended the repair of the posterior wall, and the anterior wall; if necessary amputation of the cervix; and then suspension by the round ligaments, plus advancement of the base of the bladder upon the anterior face of the uterus to cure more or less of a cystocele.

Dr. Edward A. Weiss, Pittsburg.—I would like to ask Dr. Wade why he laid emphasis on the point that he did not curet in these cases. While we do not believe in indiscriminate curetting, yet the curet has a distinct place in this type of operation. There are many cases of retrodisplacement of the uterus which can be treated with pessary, but the cases which require operation have a certain amount of pathology in the endometrium, and we believe that careful discriminate curetting is indicated in many of these cases. I should like to know his reasons for not curetting.

Dr. Wade (closing).—I expected the criticism that I have received in reporting these cases of ventrosuspension. I appreciate that at

the present time this operation is out of style. It is a simple operation although a more difficult operation will give you no better results.

I looked up thirty cases where I had suspended the uterus simply by stitches to the anterior abdominal wall with number two chromic catgut, and of these thirty cases, twenty-eight went through labor and had living children through the vaginal tract. Two of them had dead babies. One was a cross breech, and one was a face presentation. The danger in doing the round ligament suspension is that you must more or less traumatize the delicate serous membrane, and consequently you are apt to interfere with the mobility of the uterus, and if you do interfere with the mobility of the uterus, you may have an anatomical cure, but the subjective symptoms will generally be increased. Dr. Goldspohn spoke of the fact that the uterus after the repair rests upon the pelvic floor. In the great majority of cases there is hypertrophy or enlargement of the cervix, and that hypertrophied portion of the cervix is removed; the uterus is lightened thereby, and we are doing the same as we would in another hernia in removing the sac. We have found that retroversions do not cause very active symptoms. It is the retroflexions that give us the symptoms of dysmenorrhea and cause women to be sterile. If the uterus is freely movable, and most of the time retroverted in many cases, you will have no symptoms from the position of the uterus.

Dr. McPherson spoke about the danger of traumatizing the uterus in bringing it up into the abdominal wound. We have found that to be the case. In all our abdominal sections, where replacement of the pelvic viscera is necessary, no retractors are used in the wound. The uterus is grasped between the index-finger and thumb and brought up into the wound. No clamps are put upon the peritoneum in closing up, no gauze pads or gauze sponges are put in the abdominal wall that we may have a better view of the pelvic viscera. I have looked up the cases and I find we have over fifty cases where we have done repairs of old tears on the vaginal outlet three or four days following delivery or abortion. We have at the Williamsburg Hospital a great many abortion cases and many of these women have old tears which they have carried around with them for two or three years. These tears heal more rapidly, three or four days after the uterus has emptied itself, than any other time. The one danger is keeping away from engorged veins in the posterior vaginal wall.

The remarks of Dr. Marvel may throw some light upon the case that died.

Dr. Barrett spoke of the fact that the levator ani muscle and fascia must be brought together. I think I made that plain in my report. The entire repair consists in bringing the fascia muscle together, and then the skin portion of the incision is sealed secondarily with the clips and the flap we have allowed to remain, and the posterior vaginal wall protects the stitches from infection or from discharges above.

In November, 1913, we had 208 cases which my associate Dr. Walton reported in a paper published at that time in which we had used iodin in the place of curetting. As to the curet, you cannot see the work of the curet, and no man who has done curetting and then hysterectomized two or three of these patients, feels he has done great good with the curet. We do feel, however, that the curet has a place in diagnosis. Where you do repair work no good can come from traumatizing the interior of the uterus. The secretions will be increased in amount and the results much better in our experience by slowly dilating the cervix and swabbing the interior of the uterus with a 50 per cent. tincture of iodin and alcohol.

RENAL DAMAGE FROM CALCULI.

BY

HENRY DAWSON FURNISS, M. D., F. A. C. S.,

Adjunct Professor of Gynecology, New York Post-Graduate Hospital; Assistant Attending Gynecologist, Red Cross Hospital; Consulting Cystoscopist, New Rochelle Hospital.

New York City.

THE knowledge of the probable effects that calculi will have upon the kidney, directs our treatment in each case. A calculus that by reason of its character and location is doing no harm, and is not likely to cause damage, had best be left alone; and, on the contrary, one that because of its size, shape, position, and the presence of infection, is sure to produce serious renal effects, had best be treated by operation.

There are many factors that determine whether or not a calculus will do damage, and, as a rule, it is a combination of two or more of these that operate to cause the most serious consequences. In general these factors are size, shape, surface contour, number, location, mobility or fixation, and the presence or absence of infection.

From an experience with about forty cases, the details of thirty-two of which are shown in the chart, tables and pictures, I have come to the following conclusions:

1. Lithiasis is essentially a chronic disease. Undoubtedly the calculus in each case was present much longer than the symptoms, yet the average duration of symptoms was four years—the minimum being one month and the longest eighteen years. The development is often insidious, and frequently complete destruction of a kidney occurs with very little discomfort or interference with the general health. In only two cases, running a septic temperature, was the general health much impaired.

2. Multiplicity of stones was found in fifteen cases, though in only two were both sides affected. In calculous anuria, this bilateral involvement should always be considered. The concensus of opinion is that sympathetic anuria is rare, and that in nearly every

case it will be found that the unsuspected kidney is congenitally absent or has been previously destroyed by disease. Reflex pain is another condition that is to be looked upon with suspicion—a definite cause for pain is generally to be found, and I regard this so-called reflex pain as very rare (see Case III).

3. Stones, unless multiple or very large, situated in the calices, in the absence of infection, or the opening of a blood-vessel by attrition, cause little discomfort and *little damage*. The size and location in these quiescent cases should be determined by frequent radiographs, and when the stone remains favorably situated and does not enlarge, a waiting policy should be the one used. When very large, pressure atrophy of the renal parenchyma occurs.

4. When a stone enters the pelvis of the kidney, then obstruction is likely to occur, and with the consequent retention, infection will sooner or later develop. The rougher the stone and the greater the retention, the greater the liability of infection, so the more urgent need of operation. Calculi able to be passed through the ureter, enter it soon after they have dropped into the pelvis from one of the calices. So we seldom see pelvic stones that are subsequently passed. Stones in the pelvis that obstruct have many features in common with ureteral calculi.

5. Ureteral calculi that are small, smooth, do not completely obstruct, move downward constantly and are passed in a relatively short time, do only temporary damage. Those that are fixed, or obstruct seriously the outflow of urine soon lead to irreparable damage, especially if infection takes place. Stones in the pelvis that ball-valve it, and ureteral calculi, as a rule, cause much more suffering and greater renal damage than stones located in the calices, especially when upon the retention, infection supervenes. Ureteral calculi often become embedded in the ureteral wall, and after operation, stricture of the ureter is very apt to occur, and cause further damage of the kidney.

6. The effect of calculi upon the kidney is dependent mostly upon the obstruction that is produced, and is added to by infection, which was present in 68 per cent. of my cases. There were nine cases of pyelitis and pyelonephrosis, five of pyonephrosis, and five of infected hydronephrosis. In seventeen cases the function of the involved kidney as compared with its fellow was determined, and in only two was it normal, in four the loss of function was moderate, in three great, and in eight complete. This analysis shows that in practically 50 per cent. there was damage to the renal function, and that in 25 per cent. it was completely destroyed. These numbers

fall short of showing the real condition, for in fifteen cases, nearly 50 per cent. of the total, no determination of function was made.

7. Of the thirty-two cases, the calculi produced no injury in thirteen, in nine there was pyelitis and pyelonephritis, in five pyonephrosis, and five infected hydronephrosis, and I believe it is fair to assume that some of the nine pyelitic and pyelonephritic cases would have in the course of time advanced to the stage of pyonephrosis and infected hydronephrosis; and that of the thirteen undamaged cases, many would later have become more seriously involved.

8. In the pyonephrosis cases and the infected hydronephrosis with great loss of function, nephrectomy is advisable.

9. In the ureteral cases with great loss of function, it is debatable whether the removal of the stone, or the kidney, is advisable. My own opinion is that better results are obtained by removing the kidney than the stone, and that the best results come from removing the kidney and ureter to a point below the stone.

10. As infection is one of the greatest dangers, our examination should be conducted with this in mind. The method upon which I insist is radiography, first and always. The estimation of the damage done the kidney is best determined by observation, through a cystoscope, of the elimination of indigo-carmine injected intravenously. Seldom is there any need for the use of the ureteral catheter. Occasionally, but not often, it is necessary to insert an *x*-ray catheter to be certain that a given shadow is in the ureter, or to pass a waxed tip catheter when radiography fails us.

TABLE 1.—DISTRIBUTION OF CALCULI.

Kidneys	14	Right, 7	Calices 5
			Pelvis 5
			Pelvis and calices 1
		Left, 5	Calices 3
			Pelvis 2
		Both, 2	Calices 0
			Pelves 2
Ureters	12	Right, 9	
		Left, 3	
Kidney and ureter,	4	Right, 3	
		Left, 1	
Kidney and kidney and ureter	1	Right kidney and left kidney and ureter.	
Doubtful	1		

TABLE 2.—NUMBER AND SIZE OF CALCULI.

Single	17
Two or more	15
Size:	
Small	11
Large	8
Medium	9
Large and small	1
Medium and small	1
Not determined	2

TABLE 3.—EFFECT ON KIDNEY

Pyelitis	9
Pyonephrosis	5
Infected hydronephrosis	5
None	13

TABLE 4.—DURATION IN YEARS.

Minimum	1 month
Maximum	18 years
Average	4 years

TABLE 5.—PREVIOUSLY PASSED STONES.

Number	7

TABLE 6.—FUNCTION OF INVOLVED KIDNEY.

Before operation.	
No loss	2
Moderate loss	4
Great loss	3
Complete	8
Not determined	15

After operation.

In only three cases was this determined. In two cases there was improvement, and in one the improvement was doubtful. The actual results are probably better.

TABLE 7.—OPERATIONS WITH RESULTS.

		Cured.	Died.	Improved.
Pyelotomy	6	4	1	1*
Pyelonephrotomy	1	...	...	1
Nephrectomy	4	3	1	...
Ureterotomy	9	8	1†	...
Ureterotomy and subsequent nephrectomy	1	1	...	...
Passed stones	2	...	...	...
Nothing done	9	...	...	...

CASE I.—Referred by Dr. D. W. Cairns, of New York. Seen first on March 4, 1906. In 1898 noticed for the first time that the urine was turbid; this has persisted until the present. In 1903 passed an

* Large calculus in either pelvis. Only one side operated. To return for removal of other stone.

† Died of pneumonia on second day after operation.

oblong, hard stone, which was quite rough. Had been suffering much with colicky pain in the right renal region for six years previously. Since the passage of the stone has had pain in that side, but no colics. Both ureters were catheterized, and purulent urine obtained from the right. Lavage of the renal pelvis helped, but did not clear up the pyuria. Radiography showed a calculus in the right kidney. Patient refused operation and was lost sight of. When seen by me, this patient complained of only moderate discomfort and pyuria.

Case II; Fig. 5.—Referred by Dr. John Van Doren Young of New York. Seen first October 27, 1911. Aged thirty-eight. In October, 1910, had severe pain in the left side of the abdomen just within and below anterior spinous process; this was preceded for twenty-four hours by some soreness in this region. The pain lasted four hours and morphine by hypodermatic injection was necessary for relief. There was no further trouble until October 18, 1911, when there was severe pain for twelve hours; there has been much soreness since. Shortly after the first attack it was noticed that the urine was turbid. It showed a moderate amount of pus. Radiographs showed a branched stone in the left kidney, the projection going upward into one of the calices.

On November 3, 1911, I removed the stone through an incision in the posterior aspect of the pelvis, which was sutured. For forty-eight hours urinary drainage was considerable, very little in the third twenty-four, and after that none. Patient made an uneventful recovery and has had no further trouble.

This patient had a rather large calculus which had evidently been present for some time. The pain was always over the middle portion of the ureter, yet there was no history of the passage of portions of the calculus, nor were any found radiographically.

Case III; Fig. 11.—Referred by Dr. Guion, of New Rochelle. This patient had some pain in the left renal region for a short time after the birth of her only child in 1895. Since 1907 she had had attacks of pain in the left renal region, associated with temperature, nausea and vomiting. These have come on several times a year, the last one starting April 23, and persisting for five days. During this time she had frequency of urination, and noticed some blood and pus in the urine. In February, 1912, she passed some gravel.

When seen by me she was having pain in the left renal region and had a temperature of 101°. Examination of the bladder urine showed a large amount of blood and many pus cells. Cystoscopy revealed a mild cystitis. Through ureteral catheters urine was obtained. That from the left showed a small amount of pus and 0.6 per cent. albumin, no elimination of phenolsulphonephthalein after one hours' observation. That from the right showed a small amount of pus, much blood, and 0.2 per cent. albumin, and 28 per cent. phenolsulphonephthalein in one hour.

Radiographs showed two large stones in the pelvis of the right kidney (Fig. 11). Because of the symptoms referable to the left

side and the low phenolsulphonephthalein output another catheterization of the left ureter to the renal pelvis was done and 10 ounces of urine collected in a steady flow.

The stones in the right kidney were removed by posterior pelviotomy and the pelvis was not sutured. There was drainage for seventy-two hours, during which time 12 ounces of bladder urine in twenty-four hours was collected. After the cessation of the drainage 80 to 90 ounces were obtained from the bladder in each twenty-four hours.

CASE III; FIG. 11.—For the first three days after operation there was excessive thirst and vomiting. On the fourth day she became irrational, more so on the fifth, and died on the sixth from renal insufficiency.

Here is a case where the presence of shadows of stone in the right kidney with a history of left pain might lead one to suppose that the pain was of reflex origin. Had it not been for the low output of phenolsulphonephthalein that made me make another examination, I might have overlooked the 10-ounce hydronephrosis. In this case my plan of treatment was to put the right kidney in good condition and afterward to remove the left.

In this case the large output of phenolphthalein from the right kidney was misleading. At operation the right kidney was found to be fully twice normal size and very white. It is in such cases as this, parenchymatous nephritis, that the eliminaton of phenolsulphonephthalein is larger than the function of the kidney would leak one to believe.

CASE IV; FIG. 18.—Referred by Dr. P. S. Boynton, of New York. Seen first February 6, 1913. Aged fifty-seven years.

In 1898 passed four stones per urethra which, from the history, evidently had their origin in the left kidney.

On January 8, 1913, while reading was seized with sudden pain in the left renal region, radiating downward along the ureter, which required a hypodermic injection of morphine for relief. That same afternoon there was another attack. On January 11, another more severe attack, associated with chills and rise of temperature, necessitated patient being in hospital five days. Since then the temperature has ranged from 100 to 101°. Another such attack on January 29. Radiographs show shadows of two stones in the lower pole of the right kidney and one in the lower end of the right ureter. In passing a catheter into the right ureter an obstruction was met at $1\frac{1}{2}$ inches and another at 4 inches, the upper one being the most difficult to pass. Oil was injected above the stone at this time, and on February 8, glycerine, but neither dislodged the calculus.

On February 11, Dr. Boynton removed the stone transperitoneally, after milking it to a point opposite the promontory of the sacrum. This stone was the size of a pea, and shaped like an arrowhead. Patient died forty-eight hours after operation from pneumonia.

Remarks.—The long freedom from the trouble after the passage of

CHART NO. I.

		Figure number	Kidney: Right: Calices	Kidney: Right: Pelvis	Kidney: Left: Calices	Kidney: Left: Pelvis	Ureter: Right	Ureter: Left	No. of stones	Size(a)	Duration, years	No. previously passed	Pus	Blood	Loss of function (b)	Pyelitis	Pyonephrosis	Infected hydronephrosis	Operations(c)	Result(d)	Improvement of function(e)	Remarks
1	Olstein	.....	1	...	...	...	...	...	1	M	6	1	+	+	ND	+	o	o	o	S	o	
2	Hermitage	5	...	1	...	...	...	...	1	L	2	o	+	+	ND	+	o	o	P	C	o	
3	Taylor	11	...	2	...	...	...	...	2	L	6	o	+	+	?	+	o	o	P	D	o	Phenolsulphonephthalein normal. Large white kidney. Parenchymatous nephritis.
4	De Bond	18	1	...	...	...	1	...	2	S	1/12	1	+	+	ND	+	o	o	U	D	o	Died pneumonia.
5	Berls	10	6	1	...	...	1	...	8	L S	10	o	+	+	G	+	o	o	PN	I	o	Nephrectomy would have been better.
6	Quineer	9	...	...	...	1	...	...	1	S	4	o	+	+	ND	+	o	o	P	C	o	Small stone ball-valved pelvis.
7	Cogger	12	...	1	...	1	...	...	2	L	6	o	+	+	G	+	o	o	P	I	o	Only one side operated. Patient was in bad condition. Improved.
8	Hyman	4	1	...	...	...	...	...	1	S	1	o	o	+	ND	o	o	o	o	S	o	Hematuria, slight, short time, only symptom.
9	Haltz	.....	...	1	...	1	...	...	2	?	18	o	+	o	M	+	o	o	o	S	o	Constant hematuria and backache 18 years.
10	Levey	6	...	...	2	...	1	3	6	S	1 1/2	2	+	o	ND	o	o	o	o	S	o	Was six months pregnant. Escaped observation.
11	Amandola	15	...	...	...	1	...	...	1	L	2 1/2	2	+	o	C	o	+	o	o	S	o	Large stone in pelvis. Kidney very large. Function completely destroyed.
12	Barker	17	...	...	4	...	...	...	4	L	10	o	+	o	C	o	+	o	N	C	o	Only symptom pyuria, accidently discovered.
13	Ferando	14	...	...	...	...	...	1	1	S	2	o	+	o	C	o	+	o	N	D	o	Died from uncontrollable hemorrhage.
14	Diamonstein	16	...	...	4	...	...	...	4	L	?	o	+	o	C	o	+	o	N	C	o	Complete loss of function.
15	Brondahom	1/2/3	1	...	...	...	1	...	2	M	2	2	+	+	N	+	o	o	PS	1	o	Passed large ureteral calculus spontaneously.
16	Dinsberg	13	...	...	1	...	...	...	1	M	3	o	+	o	C	o	+	o	N	C	o	Small stone lower calyx. Pus came in ropes from ureter.
17	Laporto	7	...	1	...	...	...	...	1	M	4	o	+	+	M	+	o	o	P	C	1	Stone ball-valved pelvis. Operated two years ago for appendicitis—erroneously.
18	Kaufman	8	1	1	...	...	...	...	2	S M	4	o	+	o	M	+	o	o	P	C	1	Both stones removed through pelvis. Improvement in function at end of two weeks.
19	Marois	24	...	...	...	...	...	2	2	S	5	o	+	o	ND	+	o	o	N	C	o	Intermittent attacks, ureteral obstruction—chills—temperature.

		Figure number	Kidney				Ureter		No. of stones	Size(*a*)	Duration, years	No. previously passed	Pus	Blood	Loss of function (*b*)	Pyelitis	Pyonephrosis	Infected hydronephrosis	Operations(*c*)	Result(*d*)	Improvement of function(*e*)	Remarks
			Right		Left																	
			Calices	Pelvis	Calices	Pelvis	Right	Left														
20	Loesse	..	?	?	?	?	?	?	2	2	4	4	o	o	N	o	o	o	o	S	o	Passed uric acid calculi both before and after *x*-ray. Fine radiographs—no shadows.
21	Ronner	28	...	...	...	...	2	...	2	L	6	o	o	o	C	o	o	o	N	C	o	Intermittent attacks ureteral obstruction.
22	Razza	23	...	...	...	...	1	...	1	M	1	o	+	+	M	+	o	o	N	C	1	Diagnosed wrongly as typhoid. Ureter size little finger above stone.
23	Holmer	22	...	...	...	...	...	1	1	M	2	o	+	o	ND	+	o	o	o	S	o	Stone in intravesical portion ureter. Operation refused.
24	Woodward	25	...	...	...	1	...	...	1	M	3	o	+	o	ND	o	o	+	U	C	o	Two ill-advised operations on kidney—stone lower end ureter.
25	Guntcher	29	...	...	...	...	2	...	2	L	4	o	+	+	G	+	o	o	U	1	o	Overlying bladder mucosa fulgurated. Stones came into bladder.
26	Corwith	20	...	...	...	...	1	...	1	S	1	o	+	+	ND	+	o	o	o	S	o	Patient died heart trouble three months after consultation.
27	Blebl	27	...	...	...	...	...	1	1	S	6	o	+	o	C	o	o	o	U Nec.	C	o	Ureterotomy. Later nephrectomy. Marked atrophy kidney one-fourth normal size.
28	Marie Longhlin	19	...	...	...	...	1	...	1	S	?	o	+	+	ND	o	o	o	P. S.	C	o	Was seen protruding from ureter. Passed two hours later.
29	Lena Strassman	26	...	...	...	...	1	...	1	S	2	o	+	o	C	+	o	o	U	C	1	Two ureters, right kidney. Stone in ureter to lower pole. Function upper pole normal.
30	Parry	..	...	...	...	...	1	...	1	M	8	o	+	+	ND	+	o	o	U	C	o	Intermittent attacks ureteral obstruction. Kidney large. Function probably greatly damaged.
31	Kellogg	..	...	...	...	1	...	...	1	M	4	o	+	o	ND	+	o	o	U	C	o	Had had previous diagnosis of various intra-abdominal conditions.
32	Rubel	..	...	5	...	...	5	10	S	1	3	+	+	ND	+	o	o	o	S	o	As calculi were numerous and small, advised to do nothing.

ND = Not determined

(*a*) Size — L = Large; M = Medium; S = Small

(*b*) Loss of function — S = Slight; M = Moderate; G = Great; C = Complete; N = No loss

(*c*) Operation — N = Nephrotomy; PN = Pyelonephrotomy; P = Pyelotomy; Nec. = Nephrectomy; U = Ureterotomy; P S = Passed spontaneously

(*d*) Result — C = Cured; I = Improved; S = Same; D = Dead

(*e*) Improvement in function — N = None; O = Not determined; S = Slight; M = Moderate

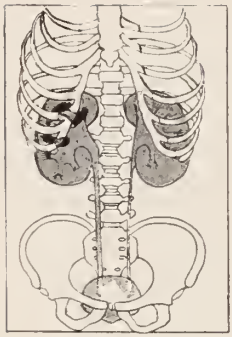

FIG. 1.

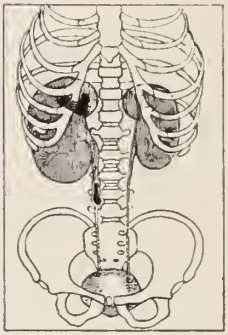

FIG. 2.

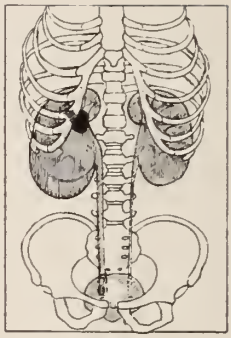

FIG. 3.

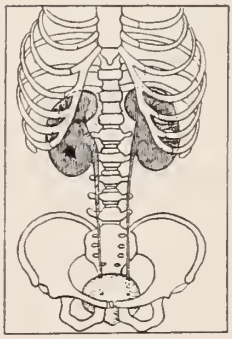

FIG. 4.

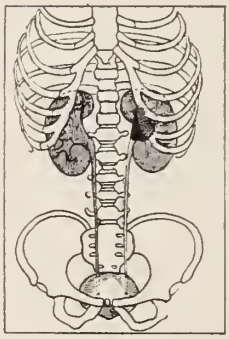

FIG. 5.

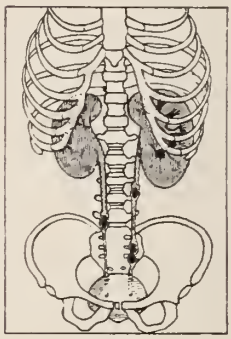

FIG. 6.

FIG. 1.—Case No. 15. Radiograph taken shortly after patient had passed small calculus. At this time kidney only slightly enlarged. The function of each was same.

FIG. 2.—Case No. 15. Two months after Fig. No. 1 was taken lower calculus engaged in ureter and caused severe renal colic. Kidney slightly larger than before.

FIG. 3.—Case No 15. After two weeks of severe colics Fig. 3 was made. Stone in lower end of ureter and kidney larger. Before passage of stone, which was induced by injecting oil, the ureter could be felt as an elastic tube size of little finger. Stone 1/4 in. by 3/4 in.

FIG. 4.—Case No. 8. Stone in lower calyx. Brief hematuria and slight lumbar pain only symptoms. Advised against operation unless symptoms became more marked or stone increased in size.

FIG. 5.—Case No. 2. Large stone in pelvis of kidney. Had only two brief attacks of pain over pelvic brim. Moderate pyuria. Posterior pelvotomy. Cured.

FIG. 6.—Case No. 10. Passed two stones one and a half years before. Moderate hematuria from left kidney only symptom. Refused further examination and treatment and escaped observation.

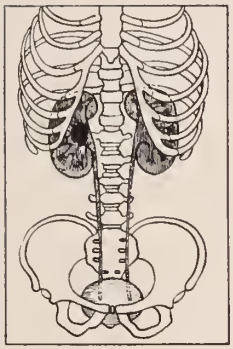

FIG. 7.

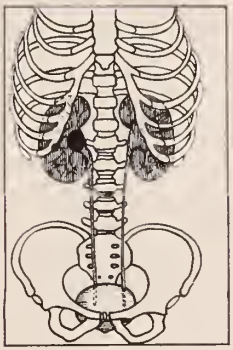

FIG. 8.

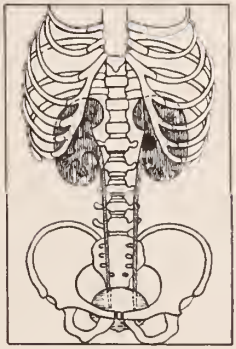

FIG. 9.

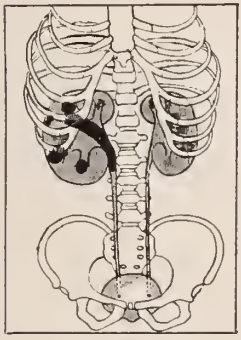

FIG. 10.

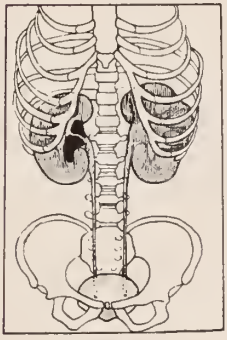

FIG. 11.

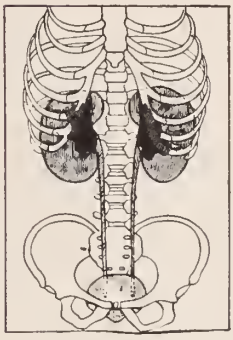

FIG. 12.

FIG. 7.—Case No. 17. Stone ball-valved pelvis and caused much pain. Erroneously operated for appendicitis. Moderate functional damage. Posterior pelvotomy. Cured.

FIG. 8.—Case No. 18. Stone ball-valved pelvis and caused much pain for 4 years. Small stone in lower calyx. Moderate functional damage. Both stones removed through pelvis. Two weeks after operation function had improved.

FIG. 9.—Case No. 6.—Stone ball-valved pelvis and caused much pain. Perinephritis. Posterior pelvotomy. Cured.

FIG. 10.—Case No. 5. Numerous stones in calices, pelvis and ureter. Great functional damage. Pyelo-nephrotomy. Some improvement. Nephrectomy would have been better operation.

FIG. 11.—Case No. 3. Two large stones in renal pelvis. Kidney greatly enlarged; acute parenchymatous nephritis. Phenolphthalein elimination normal. Pyelotomy; died.

FIG. 12.—Case No. 7. Large stones filling both pelves. Great functional damage. Right removed by posterior pelvotomy. Improved.

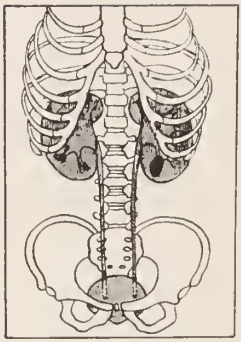

FIG. 13.

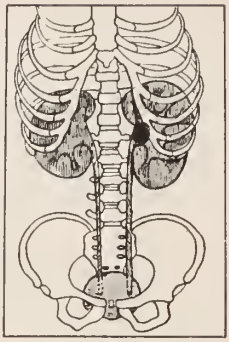

FIG. 14.

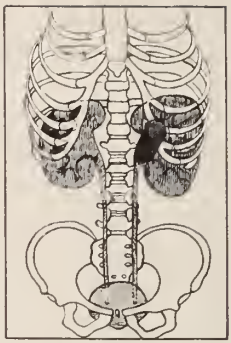

FIG. 15.

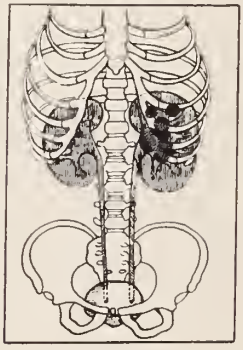

FIG. 16.

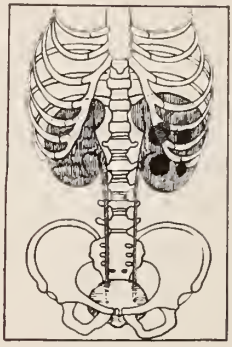

FIG. 17.

FIG. 13.—Case No. 16. Medium size calculus in lower calyx. Pus exuded from ureter in ropes. Complete loss of function. Nephrectomy. Pyonephrosis. Cured.

FIG. 14.—Case No. 13. Small calculus in pelvis. Complete functional loss. Nephrectomy. Kidney was very adherent and capsule edematous and much thickened. Whole kidney filled with miliary abscesses. Died operative hemorrhage.

FIG. 15.—Case No. 11. Large stone filling pelvis. Kidney very large. Complete functional loss. Patient septic. Lost sight of.

FIG. 16.—Case No. 14. Patient had interposition operation for uterine prolapse. When examined for backache and pyuria shortly afterwards, pus was found coming from left kidney. *X*-ray showed four large stones. These had previously given the patient little if any trouble. Nephrectomy. Pyonephrosis. Cured.

FIG. 17. Case No. 12. Aside from slight backache and pyuria accidentally discovered, no symptoms. Radiograph showed four large stones. Nephrectomy. Pyonephrosis. Cured.

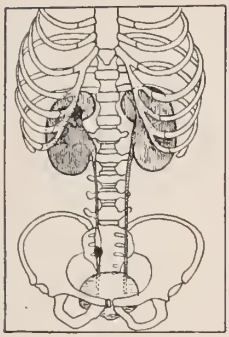

FIG. 18.

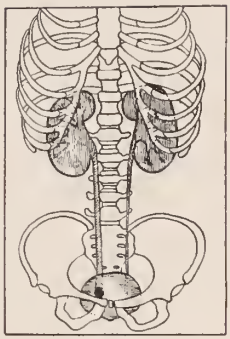

FIG. 19.

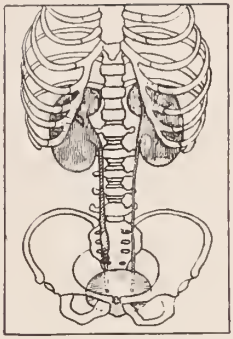

FIG. 20.

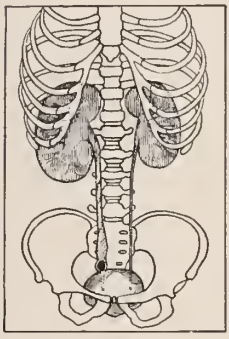

FIG. 21.

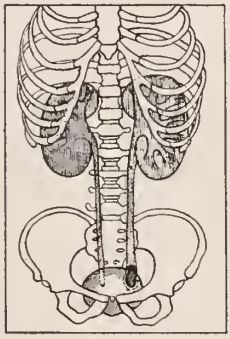

FIG. 22.

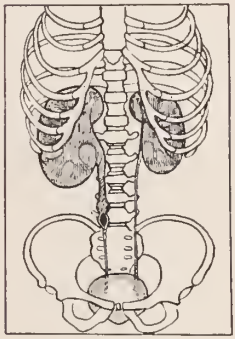

FIG. 23.

FIG. 18.—Case No. 4. Previously passed one stone. Renal colic four weeks. Stone in ureter could not be made to pass by injection of oil, though catheter could be passed beyond it. Function of both kidneys markedly lowered. Separate function not determined. Patient died two days after ureterotomy of pneumonia.

FIG. 19.—Case No. 28. Old woman came complaining of frequent and painful urination of two weeks duration. Cystoscopy showed marked edema of ureteral orifice, from which there protruded a calculus. This was loosened with a catheter and passed two hours later.

FIG. 20.—Case No. 26. Patient probably had calculus for a year, and that it entered ureter four weeks before seen. Function both sides same. On account of age advised waiting policy. Patient died of heart trouble three months later without having another attack of colic.

FIG. 21.—Case No. 31. Pain over lower right abdomen for years, diagnosed as various conditions. Attempts to make calculus pass by injection of oil unsuccessful. Function not determined. Ureterotomy. Cured.

FIG. 22.—Case No. 23. Renal colic at times for two years. Frequency six months. Stone in juzta-vesical portion of ureter. Function not determined. Attempts to dislodge by dilatation of ureter unsuccessful. Refused operation.

FIG. 23.—Case No. 22. Stone at pelvic brim. Trouble started in fourth month of pregnancy and was diagnosed as typhoid. Ureterotomy. Ureter size little finger above stone. Cured.

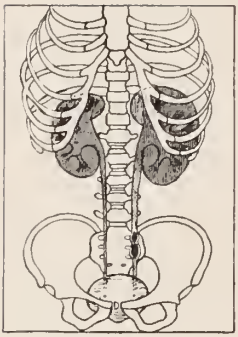

FIG. 24.

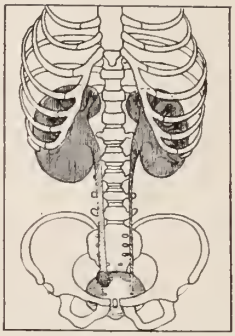

FIG. 25.

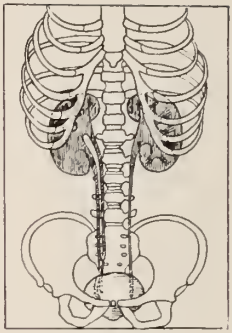

FIG. 26.

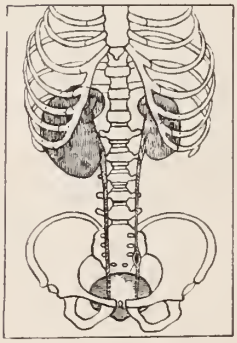

FIG. 27.

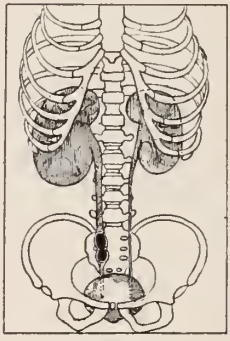

FIG. 28.

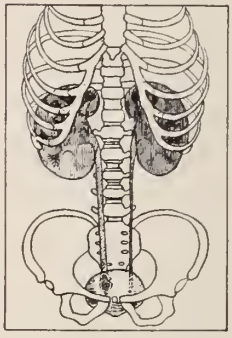

FIG. 29.

FIG. 24.—Case No. 19. For five years attacks of renal pain with chills and temperature. Pus from left ureter. Function not determined. Ureterotomy Cured.

FIG. 25.—Case No. 24. Had two ill advised operations on kidney—mistaken diagnosis. Function not determined. After removal of stone from lower ureter by ureterotomy patient was cured.

FIG. 26.—Case No. 29. Two ureters right side with calculus in one to lower pole. No elimination indigo-carmine from this ureter; occurred in 2 1/2 minutes from other right and the left ureter. Ureterotomy. Cured.

FIG. 27.—Case No. 27. Probable duration six years. Three years ago renal hematuria decapsulation. Three months afterward urinary fistula developed and drained two months. Came on account renal pain. Complete absence function. Radiograph showed calculus lower end ureter. Ureterotomy. Failure to relieve—nephrectomy of atrophied kidney—1/4 normal size. Cured.

FIG. 28.—Case No. 21. Intermittent attacks of renal colic, with nausea, vomiting, chills and temperature for six years. Complete absence of function. Ureterotomy. Cured.

FIG. 29.—Case No. 25. Several years ago attacks renal pain. Seen on account backache and hematuria. Fulgurated what was thought a broad base papilloma. Later two large stones came through fulgurated area into bladder. Refused to have these removed, or further examination.

stones in 1898, the sudden occurrence of trouble anew with two calculi in the kidney and one in the ureter, are the noteworthy features of this case. The renal calculi were not operated upon as they were not causing symptoms, and the condition of the patient was bad.

CASE V; FIG. 10.—Referred by Dr. Guion, of New Rochelle. Seen first in January, 1913. Since 1900 has had some frequency of urination and gets up three or four times at night to pass urine. In November, 1912, after lifting a heavy chair, she had sudden acute pain of a few minutes duration in the right renal region. That night there was a chill and rise of temperature, the temperature lasting a few days. In December she had temperature for several days, but with no pain. Patient never noticed turbidity of the urine until she had an attack of quinsy in January, 1912, when her physician discovered much pus. Except for a slight trigonitis, the examination of the bladder is negative. The urine from the left kidney is clear; that from the right contains a large amount of pus from which colon bacilli were isolated in pure culture. The ureteral catheter is obstructed at 9 inches. Radiographs show two large calculi, end to end, the lower extending down into the ureter and the upper into the upper calices of the kidney. There are shadows of several smaller stones scattered through the calices (Fig. 10).

Indigo-carmine injected intramuscularly appears strong from the left kidney in twelve minutes, the interval between spurts being thirty seconds and the ejection lasting five seconds. On the right it appeared in the same time, but only faintly; on this side the spurts were without vigor, but lasted fifty seconds with ten seconds interval.

On January 17, 1913, I cut down on the right kidney, which was slightly prolapsed, and only slightly enlarged. The adhesions were not marked. As the kidney appeared to contain a large amount of normal tissue, I removed the two large stones through the posterior incision in the pelvis, and several of the smaller ones by incisions in the cortex. The pelvis was not sutured. Urinary leakage for only seventy-two hours.

The patient made a good recovery, but within two months after operation passed three stones, and continued to have her pyuria. Since the operation she has had some pain in the right renal region, and as the pyuria persisted and the functional capacity of that side has not improved, I advised nephrectomy. She went to someone else with less radical views, and I lost sight of her.

Surely these calculi have persisted for a long time and yet there was only one attack of pain. The pyuria, which was also probably of long duration, was not noticed until it was found in a routine examination by her physician.

CASE VI; FIG. 9.—Referred by Dr. K. K. McAlpine of New York. Seen first on April 11, 1911. For several years this patient had been suffering from pain in the left renal region, which was relieved by the recumbent posture, to return when up and about. The urine contained a small amount of pus and blood. Radiographs showed

the shadow of a small round calculus, which at operation proved to be in the renal pelvis. This was removed by incision in the pelvis posteriorly. The pelvis was closed by fine catgut suture and there was no leakage afterward. There has been no trouble since the operation. This small stone, situated as it was and ball-valving the ureter when the patient was erect, caused a great deal of distress.

Case VII; Fig. 12.—Nurse. Seen first February 1, 1913; thirty-seven years old. Had been in good health until the beginning of the present trouble which started in 1907. At that time she was taken with severe pain in the left renal region and inability to void urine. Had temperature and was sick for two weeks. In 1908 she had a similar attack, but this time the pain was in the right renal region. After this the attacks came on, at first, every six months, then every three, and later every six weeks, alternating from one side to the other. In these she had vomiting; the pain was much relieved after vomiting; there was also dysuria, but never suppression as in the first attack. In 1910 she was taken very ill; pain, temperature, and bloody and pussy urine. Since then all the attacks have been on the right side. Began to lose weight in 1910, and for the last four or five months has been losing strength.

Examination shows a small, thin, anemic woman. Catheterized bladder urine shows a large amount of pus and some blood. Cystoscopy shows a cystitis granularis. Catheterization of the right ureter done. No drainage from it; a large amount of pus is seen coming down the ureter alongside of it. Urine from the left side shows a moderate amount of pus, and some red blood cells; 0.6 phenolsulfonephthalein injected intravenously did not appear in the bladder until nineteen minutes had passed.

Radiographs.—In each kidney, and forming a cast of the pelvis, is seen a shadow of a large branched calculus (Fig. 12).

On February 14, 1913, under gas-oxygen anesthesia, the right kidney was exposed through an oblique incision, brought into the wound and the large calculus removed through the pelvis posteriorly. The pelvis was almost one-fourth of an inch in thickness. Catgut closure of the fascia and muscles; silkworm-gut closure of skin. A cigarette drain down to the pelvis. It was my intention to have this drain remain for sixty hours, but in the dressing it was by mistake taken out. There was urinary drainage for seventy-two hours, then cessation. On the tenth day there was some escape of pus and a small amount of urine from the middle of the wound. This persisted for two days, and after that the wound was dry. The patient made a stormy convalescence; there was much nausea and vomiting for six days, and extreme weakness. However, the patient pulled around and was able to go home on the thirty-eighth day after operation. The stone in the left kidney will be left until the patient has regained enough strength to warrant its removal. Much damage to the kidney function had been done by the long presence of these calculi, and this was well indicated by the marked delay in the beginning of the elimination of the phenolsulfonephthalein. Except for urgent indications, I would not operate upon cases showing

such a low elimination. Had I used ether, or had I attempted to do both sides at once, I feel sure that I would have lost my patient.

September 7, 1913. On account of the illness and death of her mother this summer, the patient has put off operation on the other kidney. She has improved much since the operation and has been free from the attacks of pain that she experienced on the left side.

Case VIII; Fig. 4.—Referred by Dr. Guion of New Rochelle. Patient thirty-four years old, seen first on December 6, 1912. Has had four children, the last born August, 1912. Since the birth of this child she has had some backache and difficulty in walking. In the middle of November, 1912, she noticed that her urine was a port-wine color for eight days from admixture of blood. This cleared and was noticed again on December 3, though not so much as before. When seen by me there was no blood in the urine and cystoscopy failed to show any vesical cause for hemorrhage and the ureters appeared normal.

In October, 1912, she had severe pain in abdomen and back for eighteen hours, but no more on one side than the other. Radiograms of the urinary tract show a medium-sized stone in one of the lower calices of the left kidney. Unless the pain in October was due to the calculus, this patient had only her hematuria to call attention to the presence of the trouble.

I advised that the stone be determined radiographically, and that, unless there was an increase, more hematuria or other troublesome symptoms, she be not operated.

Case X; Fig. 6.—Seen first on June 1, 1910. Patient aged twenty-six; mother of two children, the youngest stillborn April, 1909. Felt well until November, 1908; when, at the fourth month of her last pregnancy, she had severe pains in the left lumbar and left inguinal regions, lasting eighteen hours. There was some temperature the following week. Three weeks after the birth of the last child she passed a small oval calculus and another three weeks after this, the only pain being in the urethra as the stone was being expelled from the bladder.

Since April, 1909, she has had some pain in both inguinal and the left lumbar regions. From the first of April, 1910, she has noticed some blood in the urine, and it is for that reason that she came to consult me.

Cystoscopic examination of the bladder is negative. The right ureteral catheter is obstructed at nine inches, and the left at three inches. Clear urine from the right, and urine containing a moderate amount of blood from the left. Radiographs show two stones in the calices of the left kidney; stone in the left ureter opposite the transverse process of the third lumbar vertebra, two stones in contact in the pelvic portion of the left ureter; and a stone opposite the transverse process of the third lumbar vertebra in the right ureter (Fig. 6).

While this patient had had one attack of renal colic and had passed two stones, her chief complaint was the hematuria, which, in all probability, was due to the renal calculi in the left kidney. She became pregnant shortly after the examination and was lost sight of. The multiplicity of the stones is a noteworthy feature in this case.

Case XI; Fig. 15.—From the service of Drs. Quintard and Chace of the Post-Graduate Hospital. Seen first Janurary 16, 1913. Has had four children. During her second pregnancy in 1910, she had much pain in the left renal region. While she noticed no blood, the laboratory report showed its presence and that of a small amount of pus. This pain kept up during the pregnancy and shortly after the delivery she passed two stones from the bladder. After this she felt better until the beginning of 1913, since which time she had had constant pain in the left renal region, pyuria, and hematuria, and has lost much weight and strength. Since the middle of December, 1912, has been having chills and running a high temperature. Von Pirquet positive. January 21, 1913. Patient thin, weak and shows the effects of septic condition. Bladder holds without discomfort 200 c.c. boric acid solution. General catarrhal cystitis. No urine seen coming from the left kidney. Indigo-carmine injected intramuscularly appears on the right side weakly in nine minutes and strongly in twelve. None eliminated from the left. January 20, phenolsulfonephthalein in two hours 82 per cent.

February 12, 1913. While in the hospital temperatue ranged from 99.5° to 101°. Radiographs show the shadow of a calculus the size of a pigeon's egg in the pelvis of the left kidney (Fig. 15). The patient went to the country to gain strength before operation and was lost sight of. In this instance the calculus had caused infection and destruction of the kidney and a nephrectomy would have been indicated.

Case XII; Fig. 17.—Referred by Dr. Edward Quintard, of New York. This patient was first seen in June, 1909, on account of pyuria. She was forty years old, a widow, who had never had any children. In 1900 her maid told her that the urine in her chamber was turbid and suggested that it be examined. It was found to contain a large amount of pus. She had no frequency of urination. She had for a short time only mild pain in the lumbar region, no more marked on one side than the other. Was treated for years with bladder irrigations without benefit. Radiographs showed four large stones in the region of the left kidney. At operation it was found that the kidney was the size of a grape fruit, with very little renal tissue left. Nephrectomy.

This patient had four enormous stones in the left kidney that had practically destroyed it, and the only symptom of which she had complained was pyuria, and this did not bother her other than by the knowledge of its presence.

Case XIII; Fig. 14.—Seen first in July, 1913; thirty years old. She was an Italian from whom we were able to obtain very little history. For three months she had been suffering with pain in the left renal region and had been having chills and temperature. For this length of time the urine had been turbid from the presence of pus. Examination showed a thin, anemic, much run-down woman, who had a tumor mass in the region of the left kidney the size of a grape fruit.

Cystoscopy showed a mild general cystitis. Both ureters were

catheterized and clear urine obtained from the right, while urine containing a large amount of pus came from the left. Ten cubic centimeters of a 0.3 per cent. indigo-carmine solution was injected intravenously. Strong elimination began on the right in three and a half minutes, while on the left there was none in half an hour. Radiographs showed a stone in the pelvis of the kidney.

In July, through an oblique lumbar incision, I cut down on the left kidney, which was densely adherent, and with difficulty removed it. A large vein in the pedicle was torn, and there was profuse hemorrhage, which was not controlled until the patient was practically moribund. She died within a few minutes after being put to bed.

On section the kidney was found to consist of hypernephromatous tumors scattered all over it, extending from the cortex inward. These were found to be filled with miliary abscesses. In the pelvis of the kidney was found an oblong stone half an inch by one-quarter. The hypernephroma and the stone are probably only coincident. The destruction of the renal function was due more to the pyelonephritis than the tumor.

Case XIV; Fig. 16.—L. D., thirty-nine years old, married, five children. After the birth of first child she had chills and fever for three months, beginning on the third day. The nature and location of infection was not obtainable from the history. For three and a half years patient has had pain in the left lower part of the abdomen which radiates to the back and down the leg; the pain coming on three or four times a day and lasting ten minutes. In October, 1913, she had an interposition operation for prolapse. This patient was first seen by me in April, 1914, at which time she was complaining of pain in the left lumbar region and marked pyuria. Examination of the bladder after an injection of indigo-carmin showed normal elimination from the right side and none from the left. Pussy urine was obtained from the left ureter by catheterization. Radiographs showed several shadows in the region of the right kidney. On May 10, Dr. Samuel Lloyd removed the left kidney, which upon section proved to be a large hydronephrotic kidney with several stones in the calices, and one in the pelvis.

Patient made an uninterrupted recovery.

Case XV; Figs. 1, 2, 3.—Mrs. B. Seen first on June 15, 1914. For ten years has had frequent and burning urination. In 1912 passed two small calculi; had some pain in the bladder at the time, but there was none in the kidney regions at the time of passage or before. In 1912 for a brief time suffered from terminal hematuria. In 1913 began to have periodic attacks of pain in the right lumbar region, these attacks being more severe at the time of menstruation. In April, 1914, had a severe attack of right renal pain, radiating down the ureter, this followed by the passage of a small calculus. Radiographs made at this time showed two stones in the upper calices of the right kidney, with a very small shadow in the region of the lower end of the ureter. Since then has been having dull aching pain in the right kidney region, radiating downward along ureter.

The urine shows many pus cells, cystoscopy cystitis granularis. The elimination of indigo-carmine from the left ureter took place in five minutes and fifteen seconds, and was strong; from the right in six minutes and fifteen seconds and was fainter than on left.

June 17 the patient was again radiographed and one stone in the kidney and a large long one in the ureter at the level of the transverse process of the third lumbar vertebra were found.

On July 1 patient began to have severe renal colic that lasted four days. From then on she had several acute attacks of colic. On July 11 the stone could be felt through the vagina in the lower end of the ureter. A ureteral catheter was inserted and met an obstruction one inch up. This was overcome and 3 drams of machine oil was injected. After the removal of the catheter the stone was not to be felt through the vagina. On July 13 and 14 the patient had particularly severe pains, with much bladder discomfort. On the afternoon of the 14th the stone could be felt very low in the vagina and the ureter as a distended tube back of it, the size of the little finger. On the morning of the 15th, the patient was relieved of her kidney pain and in a short time passed the calculus, which was of the shape of a date pit, but one-third larger. The stone was oil soaked, and the urine that was passed at the time and subsequently contained much oil.

The three radiographs show in addition to the stone an enlargement of the kidney at first slight, but at the time of the ureteral obstruction quite marked. The patient has at times some discomfort in the kidney region. She will have the renal calculi removed this fall. The functional damage at the time of my first examination, which was before the stone obstructed the ureter, showed only moderate loss of function.

Case XVI; Fig. 13.—E. D. Aged sixty-seven. It has been difficult to obtain much history from this patient. For seven years she has had pain in the region of the left kidney of a dull aching character, and frequent urination for the same length of time. In 1911 she had hematuria for a short time. She came to the clinic in July, 1914, complaining of frequent urination. Cystoscopy showed a moderate grade of cystitis. The left ureter showed some redness around it, but this was not marked. After a short period of observation pus in the form of a rope was seen coming from the left ureter; this did not coil up in the bladder as there was little adhesive material in it, and the rope broke up upon the least disturbance of the fluid in the bladder. There was no elimination of indigo-carmine from this side, though on the other it occurred in six minutes. Radiographs showed the presence of a shadow in the region of the left kidney.

On Sept. 2, 1914, through an oblique incision the left kidney was removed. It was most densely adherent. Upon section it was found that the kidney had been converted into a hard, tough, fatty mass, and that there was only a small portion of kidney substance at the lower pole remaining. In the lower pole is found the stone that was responsible for this destruction. Patient is making a good recovery.

CASE XVII; FIG. 7.—L.L. Referred by Dr. G. G. Nicosia. Seen first on May 30, 1914. For four years there was a slight flocculent deposit in the urine. In 1910 had appendectomy on account of pain located over McBurney's point and in the right lumbar region, but this gave her no relief, and this same pain has continued until the present. It is made worse by exertion. In December, 1913, and January and March, 1914, the urine was bloody for a period of two days. Since May 22 there has been marked frequency of urination.

Examination.—Urine shows many red blood cells and a few pus cells. Cystoscopy; acute cystitis with marked edema around the right ureteric orifice. Indigo-carmine injected intravenously was eliminated from the left kidney in six minutes and from the right in nine, but the color on the right was faint. Radiograph shows a medium sized round calculus in the pelvis of the right kidney. On June 8 this was removed through an incision in the posterior wall of the pelvis. Patient made an uninterrupted recovery and has been relieved of all symptoms.

Sept. 11, 1914. Examination to-day shows normal bladder. Indigo-carmine injected intravenously is eliminated from the left ureter in five and a half minutes and from the right in six and a half. This shows a marked improvement in renal function after operation.

CASE XVIII; FIG. 8.—August 8, 1914. L. K. aged twenty-seven. She has had three children, the youngest two years old. For the past two years she has had pain in the right lumbar region, which comes on intermittently, and frequently has been so severe as to necessitate morphia by hypodermic injection. For the past six weeks this pain has been particularly severe, and for four weeks the patient has been in bed. Patient gets up from one to four times at night to pass her urine. For six years she has had marked digestive disturbances, which consist of nausea and vomiting, and pain one or two hours after eating. In this time she has lost 40 pounds in weight. Radiographs show a shadow in the region of the pelvis of the right kidney, and a smaller one, 1 inch outside of it. The kidney was exposed and pelvis opened, and the larger stone removed from it. With a Blake gall stone forceps the small stone was removed from one of the calices of the kidney through the pelvis. September 10, 1914, patient made an uninterrupted recovery, and has been entirely free of symptoms.

CASE XIX; FIG. 24.—Seen first May 13, 1910. Forty-nine years old. Menopause at forty-two. Her first labor was in 1888, and was instrumental. For six months she was very sick with puerperal fever and phlebitis of both legs, and not well for fifteen months. From 1888 to 1891 she suffered with frequent attacks of pain in the right renal region, and high temperature. The last one terminated in the passage into the bladder of a large amount of pus. There was no trouble until 1907, when she began to have similar attacks in the left side, lasting four to five days. In the past year she has had several. Has had moderate pyuria since 1900. Catheters easily passed into both ureters. That from the left kidney drains purulent

urine; and that from the right clear. Radiographs showed two shadows in the pelvis that were diagnosed as ureteral calculi after a confirmatory plate with an *x*-ray catheter (Fig. 24).

On January 16, 1911, in Quebec, by the combined intra- and extraperitoneal operation, with an incision along the outer border of the rectus, I removed two small stones from the ureter, which were situated 2 inches from the vesical orifice. Cigarette drain for forty-eight hours, after which there was no leakage. The ureter was not sutured. This patient was seen April 12, 1912, and reported that she was well and had no further trouble. The stones were only 1/8 inch in diameter, a size that would ordinarily easily pass through the ureter. These were very adherent to the ureter, yet the ureteral catheter was passed with no sensation of obstruction.

Case XX.—Referred by Dr. James T. Padgett of New York. Was first seen September 25, 1911. Aged fifty-seven. Four children; youngest nineteen. Menopause at fifty-one.

In July, 1902, patient had severe pain in the right lumbar region which radiated down the back of leg, and to the bladder. There was almost incessant urination. The attack lasted two days, the spasms of pain being of seven hours duration with intermissions of three. She passed quantities of gravel that looked like granulated sugar. She had pain along this ureter from then until 1905. In 1905 she had a similar attack, lasting five days, which was terminated by the passage of a small calculus; this attack was on the left side. In 1907, after pain in both kidney regions for two months, she passed a small calculus after six hours of severe pain.

In March, 1911, she had blood in the urine for a short time. Was then radiographed, but no evidence of stone was found.

In March, 1911, she began to have pain over the left dorsal region, which after a time appeared over the sternum and later over the breasts. These attacks would last from ten to twelve hours, and at first were three weeks apart. Recently the interval has been a week.

On September 26, Dr. Leopold Jaches radiographed her with negative results. I then injected both renal pelves with 50 per cent. argyrol and obtained good radiographs showing normal pelves and ureters. The elimination of indigo-carmine occurred from both kidneys within seven minutes after intramuscular injection. The urine was negative. She was free from pain until October 22, 1911, when she had a mild attack. On December 21, 1911, after suffering from Thanksgiving, she passed a small calculus from the left side. She was comfortable until July 4, 1912, when she had pain in the left renal region and after five hours passed about twenty grains of gravel. There was soreness in the left renal region at the time of the report, June 25, 1912.

September, 1913. Since June, 1912, the patient has at times had attacks of pain in the left renal region and has passed two calculi. The history of the passage of calculi, both before and after radiographs, and the normal pelves, as shown by the pyelographs, led to two conclusions; that the *x*-ray failed to show stones that were

present, or that the kidneys and ureters were free of stones at the time of making the pictures, and that they subsequently formed.

Case XXI; Fig. 28.—Seen first in November, 1909. Fifty-six years old; nine children, last born in 1899. Was in good health until 1904, when she began to have attacks that presented the following symptoms: Lassitude for a few hours, lameness in the right leg, soon followed by slowly developing pain in the right lumbar region, which soon radiated to the front and down the ureter to the bladder. When the pain was at its worst there was vomiting. An attack lasted, as a rule, about twelve hours. During an attack there was frequent desire to urinate; the urine then passed was clear, while that following was turbid and had a heavy sediment. She has these every two or three months, the last one being in April, 1909.

Cystoscopy negative. Ureteral catheter easily passed on the left; the urine from this kidney was clear. On the right the catheter was obstructed at three and one-half inches, and through it no urine was obtained. Indigo-carmine injected intramuscularly was eliminated in nine minutes from the left kidney, while none was observed from the right. Radiographs showed two large stones in the pelvic portion of the right ureter (Fig. 28).

On January 13, 1913, through an incision along the outer border of the right rectus, I removed these two stones extraperitoneally. Each stone is three-fourth inch long by one-fourth of an inch broad. The wound in the ureter was closed with fine catgut, and the abdominal wound drained for twenty-four hours. There was no leakage and healing was prompt.

For six years this patient suffered from attacks due to these stones, and in this time the renal function was destroyed. Early diagnosis and treatment would have saved her a good kidney.

Case XXII; Fig. 23.—Referred by Dr. Scaturo, of New York. Aged twenty, when seen November 10, 1912. Married in January, 1912, and had a child in October of the same year. From the time she was five months pregnant she had pain over the appendix region, and had chills and fever which led to the diagnosis of typhoid fever. The urine contained much pus. The patient is anemic and shows the result of her illness. The catheterized bladder urine contains much pus. Cystoscopy of the bladder negative. Clear urine from the left kidney. The right ureteral catheter was obstructed at five inches; purulent urine from the right. Radiographs of the urinary tract showed a shadow at the point of obstruction on the right. The patient felt better after the examination, which was probably due to the fact that I loosened up an impacted stone.

On December 8, I removed the stone transperitoneally. The ureter above the stone was dilated to the size of the adult forefinger and was much thickened. The incision was made through the peritoneum, which was adherent to the underlying ureter, and the stone removed. An ounce of urine escaped and shot up into the air about an inch and a half, although the pelvis of the patient was elevated. The wound in the ureter was closed with fine catgut and the peritoneum sutured over it. The stone was T-shaped, and one fourth

of an inch long, with the transverse portion of the T something nearly one fourth inch broad. Patient made an uninterrupted recovery and, at the present time, September, 1913, is well and free from symptoms.

Sept. 7, 1914. Examination shows moderate cystitis colli. Indigo-carmine injected intravenously was eliminated from the left kidney in six minutes, but none was observed to come from the right. Ureteral catheter obstructed on right at five inches, but could be forced up to eight inches. No retention shown at this distance; small amount of pus in right urine. The patient has a stricture of ureter and kidney function is badly damaged.

Case XXIII; Fig. 22.—Referred by Dr. Edward Quintard of New York. Seen first in June, 1910, when she was fifty-seven years old. Has had three children, the oldest born in 1877, and the youngest in 1897. Labors normal. Menopause uneventful at the age of forty-eight.

Previous history negative. In June, 1909, the patient for the first time had colicky pain in the left renal region, which did not radiate, and lasted twelve hours. There was nausea and vomiting during the attack. At this time there was no frequency of urination, but a month later she began to be so troubled, and this has persisted until the present. Since the first attack there have been three others, but none so severe as the first. The urine is normal except for the presence of a few pus and red blood cells.

By vaginal examination, just to the left and behind the cervix, is felt a small, hard oblong mass. The bladder appears normal. On the left side the ureteral catheter meets an obstruction at three to four inches which can be passed. A waxed catheter was then passed and all the wax scraped off. Radiographs show a shadow at the point the ureteral catheter was obstructed.

Attempts were made to have the stone pass by dilating the ureter to 20 French, but were not successful. There was marked inflammatory reaction in the ureter after this instrumentation, and this explains the failure. She refused operation and was lost sight of.

In this case the pain was renal and the only thing to indicate the low position of the stone was the frequent urination. Although the stone was in the terminal portion of the ureter, the appearance of the ureteric orifice was perfectly normal.

Case XXIV; Fig. 25.—Seen first in January, 1913. The history of this case is rather indefinite as I have been unable to ascertain all the facts. Three months before I saw her, she had had her right kidney explored, and it was said that then she had an infected hydronephrosis due to ureteral obstruction. From time to time, previous to operation, she had been having marked pain in that kidney and running a temperature. Until the drainage wound healed she did well, but upon its closure she began anew to have her old symptoms. A month and a half before I saw her she was operated upon for the same condition by another surgeon, who obtained the same results. The three weeks before my visit she had been running a high temperature and having a great deal of pain in the right side.

The left ureter was easily catheterized. On the right side the catheter met an obstruction at 1 inch. This obstruction was movable, and at the end of my examination I was able to get the catheter in without resistance for two and one-half inches, but no further. By the vagina I felt a hard mass in the ureter region, about the size of a pea, that I felt sure was a stone. I suggested radiographs, and the shadow of a stone was found. The surgeon who did the second operation removed this stone extraperitoneally, and the patient made a good recovery and has been relieved. With our present-day methods of diagnosis, I think it inexcusable for a surgeon to explore a kidney without making use of them. This case is one in point.

Case XXV; Fig. 29.—Referred by Dr. E. W. Peterson. Seen first July 10, 1912. Forty-nine years old. In 1901 patient had a three-day attack of pain in the right renal region, followed by the passage of a stone and hematuria. She was free from pain and any bladder disturbance until April, 1912, when she had pain for an hour in the right lumbar region. Since then she had had almost constant macroscopical hematuria, and urgent and frequent urination.

The catheterized bladder urine is turbid and reddish from the admixture of blood and pus. Cystoscopy shows what appeared to be a broad base papilloma over the region of the right ureter, with surrounding edema. This could also be felt through the vagina. Thinking it a papilloma, I fulgurated it on July 14, and again on July 18. At the examination on the 21st., I was surprised to see a dark stone projecting through the tumor-like mass. An attemp' was made to liberate this through a Kelly tube with the aid of a small curet. This was unsuccessful as the patient was very fat, and would not retain a proper posture and repose. On July 25, another examination showed the stone almost born. It appeared to be of the size of a hazelnut. I planned to have her come to the hospital with the idea of (under ether) introducing a large Kelly cystoscope and seizing the stone with a wire snare and thus removing it, and if it were too large, to crush it with a lithotrite and wash out the fragments. We had had radiographs made, which were unsatisfactory, so this accounted for the error in diagnosis.

After this I did not see the patient until January, 1913, when upon examination I found two stones the size of a hazelnut in the bladder. The ureteral opening on the right was the size of a lead pencil and was not inflamed or edematous. She had had much pain for three months in the right side, so I suspect the presence of other calculi in the right kidney or ureter.

This was a very instructive case and shows that all cases of supposed papilloma, where the growth is situated over a ureteric orifice, and there is edema, should be radiographed for stone. Fulguration is a slow, but bloodless, and only slightly painful method of liberating these impacted calculi in the lower end of the ureter.

Case XXVI; Fig. 20.—Mrs. W. F. C. First seen Nov. 13, 1913, aged fifty-three. Three years ago patient was troubled with very painful urination and hematuria which lasted two days. For many years patient has had frequency of urination.

In January, 1913, she had pain in the right lumbar region and painful urination, which lasted one day; on August 13, 1913, there was a similar attack. Since the first of September, 1913, she has had some pain in the right lumbar region, which on November 11, was very severe. At that time she had urgent desire to urinate, nausea and vomiting. The next day blood was discovered in the urine, this lasting for a day. Radiographs made to-day show a shadow suspicious of stone in the pelvic portion of the right ureter. Indigo-carmin injected intravenously is eliminated in four minutes on both sides. Microscopical examination of the centrifuged urine show many hyaline and finely granular casts, but no blood nor pus. She was advised that unless she had further trouble, to do nothing for this condition. (Several months later patient died of apoplexy without any recurrence of kidney pain.)

Case XXVII; Fig. 27.—E. B. In 1908 patient was much troubled with frequent urination, which was thought to be due to cystitis colli, as local applications to the trigonum relieved as long as they were continued. In 1909, on account of pain in the region of the left kidney, she had a nephropexy, but this failed to give her relief. From October 1 to Nov. 15, 1911, she had port-wine hematuria, which the cystoscope showed was coming from both kidneys. Radiographs taken in November were negative for stone. On November 11, she had a decapsulation of the left kidney. After three weeks the hemorrhage ceased. In April, 1912, the kidney wound opened and discharged urine for two months. Since then patient has had much pain in the region of the left kidney and says that at times there is some swelling. Claims that urine at times is very cloudy.

April 29, 1914. Cystoscopy. Marked redness around left ureter, right normal. Indigo-carmine injected intravenously came from the right ureter in three and a half minutes, but none was observed coming from the left. (In the next two months this was repeated four times with the same results.) Radiograph showed an arrow-shaped calculus in the lower end of the left ureter.

June 3, 1914, the calculus was removed by extraperitoneal operation. As she was not relieved of her symptoms and as the ureteral catheter could not be made to enter the ureter more than an inch and a half the left kidney was removed. It was most densely adherent, and was only one-fourth the natural size. The surgeon who did the decapsulation told me that at that time it was normal in size.

Pathologist's Report.—Gross examination: The specimen consists of a small atrophic kidney, measuring 6 1/2 × 3 1/2 × 1 3/4 cm.; capsule stripped, reveals a coarsely irregular surface; color, opaque, yellowish gray; consistency, fairly firm. Shallow old nephrotomy wound on convex border near lower pole. On splitting, pelvis is found to be moderately dilated; mucosa congested, rough and thickened. Two or three dilatations from pelvis into kidney tissue toward cortex. Anatomical marking practically obliterated. Ureter appears a trifle thickened.

Microscopic examination shows marked degenerative changes

with sclerosis and atrophy of many glomeruli, abundant round-cell infiltration in the interstitial tissue, collapse and shrinkage of most of the tubules, thickening of the blood-vessels, and desquamation of the pelvic epithelium. There is a diffuse development of connective tissue as well as marked perivascular fibrosis. A few tubules are slightly dilated and show the remains of an acute process, containing polynuclear leucocytes and necrotic cell detritus. Many of the small atrophied tubules contain deeply staining hyaline material.

Diagnosis (O. L. Hillman).—Chronic pyelonephritis with atrophy of the kidney.

Undoubtedly the stone in this case existed at the time the radiographs were made in 1911, but as I have not seen the plates I do not know the cause of the failure to detect it then.

In the presence of an infected kidney that had completely lost its function, the operation that should have been done in the first place was a nephrectomy, with excision of the ureter to a point below the calculus. The removal of the kidney without the ureter would have been better than the simple removal of the calculus.

Case XXVIII; Fig. 19.—Mrs. M. L., aged fifty-five. Patient came into the clinic and stated that her only complaint was marked frequency of urination of three weeks' duration. Upon cystoscopy a swollen right ureter with a small stone projecting from it was seen. The stone could be pushed back into the ureter with a catheter and with each spurt of urine would descend to its original position.

Radiographs showed a shadow in the region of the lower end of the ureter. Two hours after the examination the patient claimed that she heard a small object drop into the chamber when she voided urine. An examination made a week after the first one failed to show the presence of the calculus, and the edema around the ureter had almost entirely disappeared.

Case XXIX; Fig. 26.—L. S. Age forty-four. This patient was seen first August 15 through the courtesy of Dr. Robert Abrahams. Several years ago she had an appendectomy for ruptured appendix. A ventral hernia exists at the site of the incision. For a year patient has had some dull aching pain in the region of the right kidney that she thought had some relationship to the hernia. On August 9 she had severe pain in the right renal region, radiating down the inner side of the thigh. This was acute for three days, and since then has persisted as a dull ache, more severe than that of which she had formerly complained.

Radiograph showed the presence of a shadow opposite the transverse process of the third lumbar vertebra. Cystoscope showed two ureters on the right side. Indigo-carmine injected intravenously appeared from the left and the right proximal ureter in two and a half minutes, but none came from the distal right in fifteen minutes.

On August 28 the hernia was repaired, and through an oblique incision the stone was removed from the ureter, which was immediately sutured with fine catgut. Drainage for forty-eight hours. Uneventful recovery. The two ureters appeared to be in a common sheath.

On September 9, the patient was again examined after the injection of indigo-carmine. It appeared coming from the left and the right proximal in three minutes, but it was six before any came from the right distal. This indicates an improvement in function since the operation.

Case XXX.—Miss E. P., aged forty-five. For a number of years patient has been having attacks of pain in the region of the right kidney, radiating along the course of the ureter. These are usually associated with nausea and vomiting, and in some of the attacks she has had temperature for many days with continuous pain in the kidney region. On palpation the right kidney is found to be one-third larger than normal. Radiographs show a shadow in the region of the left ureter. This stone was removed by Dr. Willy Myer, and since then patient has been free of symptoms.

Case XXXI.—December 11, 1913. Mrs. G. K., thirty-eight years old. In 1908, just after the termination of her last pregnancy, she had pain in the region of the right kidney associated with chills and temperature, radiating downward along the ureter. Since then patient has had many attacks of pain, sometimes with nausea and vomiting, but without chills. Since July, 1913, these attacks have come on much more frequently and within the past three weeks she has had three attacks. Radiographs show a small arrow-head calculus in the lower end of the right ureter. The ureteral catheter could be passed beyond this stone. The stone could be dislodged, but efforts to make it pass by injections of glycerin were without effect. Two months after the patient was first seen, Dr. I. S. Haynes removed the calculu by the extraperitoneal route, and she has since been relieved.

Case XXXII.—Seen first, September 3, 1913. Four children, youngest five months old. Has had marked lateral spinal curvature since she was seven years old. When the last baby was three days old she began to have severe pain in the left renal region, with severe headache. This persisted for ten days. Since the middle of this past July she has had pain in the left renal region, which has radiated down the ureter. She came to my clinic the last part of August when I was away, and then it was seen that the left ureter was pouting and markedly edematous. At this time ureteral catheterization was impossible, as the catheter met an obstruction a short distance up the ureter and buckled back. Radiographs then made showed shadows in the pelvis and in the renal region. When I saw her, which was shortly after a particularly severe attack of colic, when she passed several small stones, the ureter was still edematous, but not so much as when she first came to the clinic. Since then the pain has been better and the ureteral orifice on September 13 appeared only slightly reddened. Radiographs made on September 11 show shadows in the ureter just above the sacroiliac joint and several shadows in the kidney. All of these are small, and it is probable that they will pass with little difficulty. If they do not, I shall through a ureteral catheter inject the ureter with glycerin or olive oil, and in this way encourage their expulsion.

DISCUSSION.

Dr. Charles L. Bonifield, Cincinnati.—I would like to make one or two remarks in connection with this paper. In the first place, the value of the *x*-ray is undoubted in this day and age. We would not think of trying to diagnose these cases without it.

I remember very distinctly one case I operated on a couple of years ago which had been to one of my colleagues two or three years previously. He had explored the kidney with a needle, and the conclusion was reached: there was no calculus. When she came under my care, *x*-ray examination showed a calculus, and its location pretty accurately. So it was easily removed. It is very important to *x*-ray all these cases early.

The point I want to make particularly is this: I believe we should be very careful about removing any kidney in which there is any appreciable amount of healthy tissue. Professor Fisher of the University of Cincinnati has shown that animals live perfectly well with one-quarter of one kidney, provided that one-quarter is healthy. If we operate upon one kidney we do not know that the other kidney, although healthy and functionating properly at the time, may not become diseased in the next year or two, and if we can save even one-quarter or one-eighth of the kidney that functionates properly, we give the patient a better chance to survive in case the other kidney does become involved. I had this impressed upon me a few months ago. A patient came to me with pyonephrosis; her left kidney was operated upon a year ago, a stone removed, and the ureters catheterized at that time, and as far as I could find out her right kidney at that time was perfectly healthy. When she came under my care the right kidney was as large as a good adult's head, distended with pus, and there was about one-quarter of the kidney that apparently would functionate, and so I drained that, and was surprised to see before the patient left the hospital how well that kidney was functionating, so that in view of these facts it is important that if we have any kidney tissue left at all that is healthy, to try to save it.

Dr. Miles F. Porter, Fort Wayne, Indiana.—I would like to ask Dr. Furniss what, if any, observations he has made in connection with the incidence of cancer and stones carried in the kidney, and what the result of his observation has been.

Dr. Francis Reder, St. Louis, Missouri.—No surgeon to-day would invade a kidney without having a positive *x*-ray picture. I cut down upon a kidney following an *x*-ray picture that to all appearances located a stone in the lower pole. As it happened the stone was about an inch and one-half in the ureter. The kidney undoubtedly must have been displaced as the shadow showed in a manner which gave the impression that the stone was located in the lower pole.

Again, I would emphasize the importance of an *x*-ray being taken shortly before operation. In one of my cases the *x*-ray was taken three days before operation was undertaken, the stone being disclosed in the pelvis of the kidney by the Röntgen ray. When the

operation was undertaken no stone was found. The stone was passed in the meantime. An *x*-ray was again taken three days after the operation and no stone was revealed.

Dr. Lewis F. Smead, Toledo, Ohio.—I would like to ask Dr. Furniss what experience he has had with calculous anuria, where the stone is small enough to pass, if one could wait, and whether he has been forced to operate for small calculi on account of the calculous anuria alone.

Dr. Hugo O. Pantzer, Indianapolis.—The extensive experience of Dr. Furniss would lead me to ask for information. I wish to ask of him, what stress we may place upon irritability of the bladder as a symptom in these cases. Another question is, what objection the doctor has to nephrotomy, what has been his experience with nephrotomy?

My limited experience would lead me to favor nephrotomy in many cases, allowing free drainage afterward.

Dr. E. Gustav Zinke, Cincinnati, Ohio.—Recently I had an experience with kidney stones which may be of interest to you. A man, aged fifty-four, complained of no symptom in particular except that he did not void as much urine as usual; and that, occasionally, he would have a dull pain in his back. Examination of the urine revealed a slight trace of pus and a few red blood cells. The *x*-ray showed a very large stone, about the size of a rooster's head, upon the right side, and a stone, the size of a cherry seed, upon the other side. The latter gave rise to no symptoms whatever. The kidney with the large stone was easily found, exposed, incised the full length and the stone removed without difficulty. There was apparently no evidence of destruction of kidney structure, except a greatly dilated pelvis; this and the presence of a stone within the other kidney, prompted me not to remove the kidney. I therefore sewed it up and fixed it in the usual way. The man did well for one week; he then suddenly began to fail. There was no evidence of peritonitis or sepsis. He simply died of exhaustion at the end of the second week.

I relate these cases with a view to eliciting, if possible, some expression of opinion as to what the members might do under similar circumstances. Here was a kidney which, notwithstanding the presence of a large stone, did not show sufficient destruction to warrant its removal. The operation was not difficult. The case was very promising for one week, and then unexpectedly, and without apparent good reason, the man went into decline, and died of exhaustion at the end of two weeks.

Dr. Bonifield.—Did you drain that kidney or not?

Dr. Zinke.—Yes, I drained it.

Dr. Bonifield.—What killed him?

Dr. Zinke.—I do not know.

Dr. John F. Erdmann, New York City.—In regard to associated diseases and with reference to the history cited, five weeks ago I had a patient who presented all the evidences of a badly diseased kidney on one side, with marked evidences of a tumor on the opposite side.

An analysis of the urine showed blood, pus, and all the things we find in pyonephrosis, and some of the elements we might find in cases of malignancy. The radiograph showed a large stone on the right side, and an enlarged shadow on the left side. I felt that the large tumor was a malignancy, and the question of hypernephroma arose. I was bothered about the calculous side, from which the pus was coming. He had considerable temperature, with all the evidences of sepsis, and with that staring me in the face I concluded that I would remove the malignant side, and reserve the other infected side for a later stage. I removed from the left side a large and beautiful hypernephroma, the size of a good adult head leaving the other kidney alone. The patient has made an absolutely perfect recovery, but still with profound infected urine. It is my intention in the absence of metastases to attack the calculous kidney later.

Dr. Julius H. Jacobson, Toledo, Ohio.—I want to report a rather remarkable case of renal calculi. The patient was a man, thirty-five years of age, who in early infancy had a circumcision performed and the head of the glans penis was accidentally amputated. Stenosis of the urethra followed which he has carried throughout life.

When he came to consult me about one year ago, he had a great amount of pyuria, was suffering very much from renal colic, as a result of this stenosis of the urethra. The *x*-ray showed an immense calculus the size of a billiard ball situated in a diverticulum of the bladder which could be palpated through the rectum. There was also a large calculus in the lower end of the left ureter.

I removed the large stone and diverticulum from the bladder, and at the same time made an attempt to remove the stone from the lower end of the ureter. The ureter stone disappeared as soon as it was touched. The ureter above the stone was dilated to about the size of the small intestine and I could not find the stone again. I opened the abdominal cavity, made a careful search, and could not find it. At a subsequent operation I tried to remove it again, but as I touched the stone, it immediately disappeared. I searched for an hour again but was obliged to give it up. When the patient assumed the upright position, the stone came down, as was shown by the *x*-ray. At the third operation, I temporarily ligated the enormously dilated ureter, removed the stone, and cured the patient.

I also wish to call the association's attention to some important work which has come from Hamburg recently in reference to the diagnosis of those rarer forms of ureteral calculi which do not show on the *x*-ray plate. With the aid of collargol in such cases Professor Kummel and his assistants were able to get a distinct shadow where the collargol solution united with the stone. The method clears up a certain number of kidney stone cases which are otherwise obscure. I regard this as an important addition to our diagnostic methods of renal calculi.

Dr. Miles F. Porter, Fort Wayne, Indiana.—A very simple maneuver would obviate the difficulty that Dr. Jacobson speaks of in losing the stone, namely, clamping the ureter above and below the stone before he makes manipulation, and then it cannot get away.

Dr. Furniss (closing).—Dr. Bonifield spoke of leaving the kidney when there was any kidney tissue left, even if the other kidney is all right. As rheumatism, myocarditis and nephritis are often due to a focus of infection in the body, we should when possible get rid of that focus entirely.

As to the incidence of cancer in connection with these stones, I have seen one case, and that was at the Mayo Clinics.

Fortunately, I have not had any cases of anuria, but there is one point in connection with calculous anuria that I desire to call attention to, and that is, should the operator go ahead and operate on the side giving the last symptoms? That may have been all right before the days of the *x*-ray, but no man should now operate without a radiograph. In calculous anuria death does not occur for several days. Of course, where we have anuria we cannot determine the relative function of the kidneys because neither one is excreting. If we have only one chance to do one operation and no opportunity to have radiographs, it is better to do an operation on the side where the symptoms were last, for the reason that the other kidney may be destroyed.

With reference to irritability of the bladder, that depends upon secondary infection from the kidney. When the stone is in the lowest portion of the ureter we get irritability of the bladder. Fenwick has stated that in a number of cases he has been able to determine by the appearance of the ureter that the stone was in the ureter. In only two of my cases has the appearance of the ureteric orifice been changed.

In regard to nephrotomy, I have not had any stones that I have not been able to get out through the pelvis. In one I took the stones out by a combined pyelotomy and nephrotomy.

It was thought for a long time pyelotomy wounds never healed. Failure of a pyelotomy wound to heal, means obstruction below. The largest single stone I had was taken out through the pelvis; the pelvis was not sutured, and the wound was closed in one week, good and tight.

Dr. Erdmann speaks of a case of calculosis on one side, with a tumor on the other, the patient running a very high temperature. Naturally the question would come up, was this temperature due to infection or not? There is one thing brought out by the Mayos, namely, that in a number of cases of hypernephroma there was temperature associated with the hypernephroma itself. That is a point which is apt to be misleading.

MYOMECTOMY WITH EXTENSIVE RESECTION OF THE UTERUS IN FIBROID TUMORS.

BY

X. O. WERDER, M. D., F. A. C. S.,
Pittsburgh, Pa.

CONCEDING the good results recently obtained in many cases of uterine fibroids by the Röntgen ray treatment and its applicability in a certain proportion of such neoplasms of the uterus in expert hands, it is scarcely to be expected that it is destined to supercede their operative removal to any large extent. Further experience and more careful study, especially of the secondary effects of this treatment, will have to be made before its therapeutic standing can be fully determined, and in time we will learn which cases can be safely trusted to the *x*-ray treatment and which should preferably be dealt with surgically. There are, even at the present time, many reasons which can be advanced in favor of operative treatment as against the Röntgen rays, but there is in this connection particularly one which should appeal to all unbiased minds interested in the treatment of uterine myomata. I refer to the necessity of conservation of the functions of the pelvic organs, especially in young women.

While the Röntgen treatment depends essentially for its therapeutic effect in fibroid tumors on the atrophic changes it produces in the pelvic organs, and consequently the destruction of their functions, the surgeon's aim is, or should be, the saving of the functions of ovulation and menstruation, and, whenever possible, that of reproduction in women remote from the climacteric age. The conservation of these functions I consider of the utmost importance for the physical well-being of woman during her active sexual life. This fact is so well understood and recognized by all experienced gynecologists, and so generally admitted on all sides, that arguments are unnecessary and superfluous on my part to defend this position. Even such an enthusiastic advocate of the *x*-ray treatment as Prof. *Kroönig* of Freiburg says in this connection: "In cases of young women whose menstruation must be preserved, we prefer operation and enucleation, when possible, to Röntgen treatment." (The Difference Between the Old and the Newer Treatment by *x*-ray and Radium in Gynecological Diagnosis. *Surgery, Gynecology and*

Obstetrics, vol. xviii, No. 5, p. 529, May, 1914.) He admits, therefore, frankly that, at least in young women, the Röntgen treatment is contraindicated because of its destructive effect on the functions above mentioned which are so vital to the happiness and enjoyment of health of the patient, that some effort should be made to preserve them, which can be done only by proper surgical treatment. Myomectomy, therefore, is and will always be, the ideal treatment of uterine fibroids, at least in younger women. When this is not practical and the uterus has to be sacrificed, even the preservation of the ovaries is of great value and will prevent entirely, or at least to a very large degree, the symptoms so annoying and distressing in many patients.

Hysterectomy, in the writer's experience, is, however, less frequently necessary, and during the past few years has been performed in comparatively few young women. Myomectomy is possible in a large proportion of cases, not only in the presence of solitary fibroids, but even when a considerable number of these tumors are imbedded in the uterine body. If the growths are large enough to be recognized, are accessible and do not encroach too much upon the uterine cavity, they can usually be enucleated with ease, one after another, and their beds completely closed by layers of catgut sutures, beginning at the bottom of the uterine wounds and drawing the bleeding surfaces together by tiers of sutures until the serous coat of the uterus is reached. A special sero-serous suture inverting the edges of the wound surfaces covers up all raw surfaces, completely controls all oozing and completes the operation, leaving a useful and perfectly functionating, though sometimes rather crippled, uterus. Even large submucous fibroids which, when enucleated, freely open up the uterine cavity and even detach and remove considerable portions of endometrium, are no contraindication to a conservative myomectomy. The ragged mucosa is trimmed up, the detached pieces cut away, and the remaining mucous membrane closed by a continuous submucous catgut stitch in such a manner that it will not penetrate through the mucosa into the uterine cavity. The remainder of the uterine wound is then closed in the manner described above. The writer has, in a number of such cases where considerable uterine mucosa had to be sacrificed, seen pregnancy follow; one of these cases has recently been delivered of her fourth child. Previous to the operation she had been sterile.

When the larger part of the body of the uterus contains a great number of fibroids, especially smaller sized nodules, complete enucleation of all neoplasms may become impossible, and hysterectomy in

such cases is the usual procedure, because small fibroids which may be overlooked during the operation of myomectomy may within a few years give rise to a return of the symptoms. The writer has within recent years succeeded in saving at least the function of menstruation in most of the cases by doing a more radical myomectomy or a "resection of the uterus," which he considers a better term for the procedure. Instead of trying the tedious and generally impossible task of enucleating all the little neoplasms, he excises the tumor-bearing myometrium and large portions of the endometrium, especially when submucous tumors predominate, leaving, however, sufficient uterine wall and mucous cavity to enable the remaining organ to carry on the menstrual function. Many of these cases are usually sterilized by the necessity of resecting the uterine cornua, thus interrupting the tubal communication to the uterine cavity. A wedge-shaped incision is made antero-posteriorly through the uterus or, if the cornua are the seat of multiple small fibroids, it is carried below the cornua on either side into the uterine cavity, removing the upper portion of the uterine body containing the neoplasms. The incised walls of the retained uterus, as well as the uterine cavity, are then carefully searched for any fibroid nodules still remaining. If much tumor-bearing tissue is in the remaining myometrium, still further resection may be done to insure the complete removal of all neoplasms. The endometrium is then trimmed up and the cavity closed by continuous catgut sutures in the same manner as described in myomectomy. The uterine walls are then evened up and any irregularities smoothed off, so that the wound surfaces can be perfectly coapted. They are then brought together by a number of tiers of catgut sutures beginning at the endometrium which previously has been closed, until the serous coat is reached; a careful sero-serous suture covers up all the raw surfaces and completely checks all oozing. In this manner a uterus, fairly normal in appearance and useful at least as a menstruating organ, is left.

The first resection of the uterus performed by the writer was in December, 1908, and since then, in all, thirteen cases have been operated upon. All of these cases have made a good recovery, demonstrating that the uterus is able to withstand a great amount of mutilation. In this list no cases of ordinary myomectomy are included, not even those in which the uterine cavity was opened and more or less endometrium was resected. In all of these thirteen cases, from one-half to two-thirds of the uterus and endometrium has been removed. Six of them were under thirty years of age and seven over thirty, seven of them were single, and six of them married;

only one had children, two others had abortions. All of these have recently been interviewed either personally or by letter, especially in regard to the menstrual function. No pregnancies occurred in any of them; two of them had not menstruated since the operation, one menstruates irregularly and with considerable pain, one is fairly regular with slight pain; three of them are regular, but have slight pain; six are perfectly regular and are entirely free from pain. In all cases menstruation is rather scanty. Only four of these cases were sterilized through the resection of the cornua; in the others the tubal attachments were not disturbed, so that the possibility of pregnancy is not excluded. In some of them ovarian and tubal complications were present requiring resection of the ovaries and removal of the tubes.

While fewer hysterectomies have been done during these recent years in younger women than formerly, it will not be possible to avoid this operation in all cases. In very large fibroids, especially when undergoing cystic degeneration we resorted to supravaginal amputation of the uterus, because a resection proved impossible in several cases in which it was attempted, also in cases in which the cervix was more or less involved or when a large submucous fibroid extended into the cervical canal, the entire body of the uterus was removed. The most favorable cases are those with small or only moderately large neoplasms. Early operation for fibroids in young women should therefore be advocated for the reason that they present better chances for conservative treatment than when they have attained larger dimensions, either by rapid normal growth or by degenerative processes

A comparison of the mortality of hysterectomy and myomectomy would seem to be rather in favor of the latter according to the experience of the writer. Since 1898 inclusive, during which time accurate records have been kept, 707 cases of uterine fibroids have been operated upon with a total mortality of 3.25 per cent. This does not include over a hundred cases in which small fibroids were removed coincident with other operations, but only those in which this neoplasm constituted the principal indication for operation. In these 707 cases, hysterectomy was performed 536 times and myomectomy, including the thirteen cases of extensive resection of the uterus here reported, 171 times. The total mortality in the latter cases is four or 2.33 per cent., while hysterectomy was accompanied by a death rate of 3.45 per cent. or more than 1 per cent. in favor of myomectomy.

The morbidity of myomectomy also compares even more favor-

Name, age, date, married or single	Children, abortions	Symptoms	Number, size, location	Operation	Result
S. E.—Aged 36. Dec. 10, 1908. Single.	.....	Painful, profuse menstruation.	Interstitial and submucous. One pedunculated, submucous, size of walnut.	Resection of uterus. Left salpingectomy. Right salpingo-oophrectomy.	Has not menstruated since operation. No discomfort since the operation.
Mrs. F—Aged 38. Jan. 27, 1009. Married one year.	No children.	Menstruated at 13. Regular, no pain, 2 days. Dgiestive symptoms.	Five, largest size grapefruit, four small. Subserous. At fundus and anterior surface.	Resection of uterus at fundus.	Menses irregular, scanty, much pain every month.
Mrs. K.—Aged 28. March 16, 1909. Married four and one-half years. Ref. by Dr. Cooley.	Two children, last one two years ago.	Menstruated at 15. Regular, no pain, 1 week. Vaginal discharge, backache, constipation, and vomiting. Headache.	One, large interstitial, and submucous and edemotous. At fundus of uterus.	Resection of one-half of fundus. Left salpingo-oophrectomy. Resection of right ovary. Tubal attachment not distorted.	Menses every 5–6 weeks. Very scanty, 1 day. Headache, backache.
Miss S.—Aged 32. Oct. 31, 1910. Single. Ref. by Dr. Newcome.	No children.	Menstruated at 13. Regular, 3 to 4 days. Leukorrhea, pain in back and right side.	Multiple, largest size grapefruit. Left cornu. Interstitial. Bilateral dermoid cyst of ovary.	Resection of two-thirds of uterus. Right salpingo-oophrectomy. Left salpingectomy, resection left ovary.	Menses every 28 days. Scanty, 2 days. No pain.
Mrs. B.—Aged 23. Oct. 5, 1911. Married three years. Ref. by Dr. Fitzgerald.	No children.	Irregular menstruation for five years, often prolonged for weeks, growing worse.	Multiple, interstitial, size of adult head.	Resection of uterus. One-half removed. Tubal attachments not distorted.	Menses every month, regular, normal, 6–7 days. No pain.
Miss A.—Aged 23. March 18, 1912. Single. Ref. by Dr. Oye.	No children.	Menstruated at 15. Regular, lately profuse and prolonged. Leukorrhea. Pain on urination.	One, size childs' head, submucous, filling entire uterine cavity.	Resection of uterus and most of endometrium. Tubal openings possibly occludcd.	Has not menstruated since operation. No pain since operation.
Mrs. D.—Aged 32. Jan. 26, 1909. Married 15 years. Ref. by Dr. Wilson.	No children.	Regular, profuse, 5 days. Painful, pain in back and right side	Three fibroids, one size of lemon. Pyosalpinx, hematosalpinx, and ovarian cyst.	Resection of large part of uterine cavity. Right salpingo-oophrectomy, left salpingectomy.	Menses reulgar.

Name, age, date, married or single	Children, abortions	Symptoms	Number, size, location	Operation	Result
Mrs. S.—Aged 31. Feb. 5, 1913. Married 9 years. Ref. by Dr. Cossett.	No children, three miscarriages at three months.	Menses at 14. Regular, one week, profuse, backache, and bearing-down pain.	Multiple fibroids. Adnexa normal except for cob-web adhesions.	Resection of about one-half of uterine body.	Menses regular, normal, scanty, 5 days. No pain.
Miss B.—Aged 26. May 20, 1913. Single. Ref. by Dr. Donaldson.	No children.	Menses 14. Regular, 4–5 days, no pain. Flow excessive for part three and one-half years, 7–21 days, constant discharge.	Multiple, size of pea to marble, submucous pedunculated and interstitial.	Resection of fundus at right cornu including it.	Menstruation regular every 28—31 days, normal, 5 days, no pain.
Miss. C.—Aged 29. Sept. 9, 1913. Single. Ref. by Dr. Buchanan.	No children.	Menses 15. Regular, profuse. Pain in lower abdomen.	Multiple, subperitoneal, interstitial and submucous, parovarian cyst left side.	Resection of one-third of cavity and two-thirds uterine wall.	Menses regular every 28 days, rather scant, 5 days, slight pain.
Mrs. B.—Aged 25. Aug. 18, 1913. Married four months. Ref. by Dr. Heilman.	One abortion, produced, at four months. Cellulitis following.	Menses at 14. Regular, scanty and painful.	One large subperitoneal, anterior wall, one size egg, interstitial, posterior wall and several smaller ones.	Resection of uterus. Left salpingectomy. Right adnexa not disturbed.	Menses normal.
Miss S.—Aged 30. Dec. 2, 1913. Single. Ref. by Dr. Hershman.	No children.	.....	Interstitial, size of lemon, pedunculated size of hickory-nut and many smaller ones in wall. Serous cyst adenoma left ovary. Right ovary cystic.	Resection of uterus. Left salpingo-oophrectomy. Resection of right ovary.	Menses normal at first, quite profuse after operation, but lately quite normal.
Miss S.—Aged 31. Feb. 3, 1914. Single. Ref. by Dr. Bailey.	No children.	Menses at 13. Irregular, profuse, no pain.	One submucous size of grape-fruit, in posterior fundus. Adenxa enlarged but normal.	Resection of one-half of cavity and one-half of uterus.	Menses normal, 3 to 7 days, no pain.

ably with that of hysterectomy, as the cases of myomectomy almost uniformly make a smooth, uncomplicated recovery, and almost without exception enjoy perfect health after the operation; they are, in fact, among the most satisfactory cases in the writer's experience.

In conclusion, I feel, therefore, justified in making a plea for more conservative treatment of uterine fibroids in younger women than they now receive in the hands of most general surgeons and many gynecologists. Myomectomy and the more radical resection of the uterus can be profitably performed in many women whose uteri are now ruthlessly sacrificed, resulting in many cases in long years of discomfort, unhappiness and often invalidism.

DISCUSSION.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—I began to do myomectomy ten or a dozen years ago, and when I met Dr. Cullen, of Baltimore, he told me he had several cases of death from embolism. I would like to ask Dr. Werder whether in his experience he has had any such deaths from embolism?

Dr. J. Henry Carstens, Detroit.—With me the question of fibroid tumor of the uterus, like any other question, depends upon the case. If I have a young woman who has one fibroid or two or three, I do a myomectomy. If she has a number of little ones I remove the uterus. I have taken out one side of the uterus, or about one-half, but have not systematically tried to save any uterine tissue by taking away half of it or one-quarter or three-quarters. It seems to me, it cuts very little figure whether you take it all away or half of it. If the ovaries are intact, and you leave them, it does not make any difference whether you take out the whole uterus or half of it. If they menstruate afterward or not, it is of no great importance because I do not think menstruation is of benefit to these women. The question of ovarian secretion is important, and if you leave the ovaries the woman will go on just the same and never know whether the uterus has been taken out or not except she knows that she does not menstruate every month. If I were in the position of these women and was a young woman, and could have a part of the uterus removed, so that I could have children, I would rather have that operation done, and take my chances of having another operation performed at some later time.

As a general rule, fibroid tumors are bad things for a woman to have. If you do not do a radical operation the woman is going to have trouble, and surgery gets into bad repute. So I agree with Dr. Werder that in a *very few selected* cases I would perform that kind of operation.

Dr. Robert T. Morris, New York City.—There is one important factor we are apt to forget, and that is the patient herself. Ask her what she wants done. I say to a patient who has these small

fibroid tumors, that if we do a myomectomy, remove a part of the uterus and leave a part, you will probably have further development of this neoplastic growth because the original conditions persist. If you want me to leave a part of the uterus with the possibility of having further neoplastic growths, with the idea that in the meantime you may have a child, all right! One woman may say yes, then I leave it for her. Another woman may say no; then I take it all out for her, leaving the decision to the patient. I made four strips four years ago in a young woman of thirty, who had quite a number of these tumors. One strip on each side was not over one-third of an inch wide, but it carried broad ligament and ovary. I got two other strips fashioned and made a good uterus out of four pieces. It was such a nice looking uterus that I almost hated to close the abdomen over it and hide it from view. This patient is anxious to have a child. If left to my surgical judgment, with no moral question, no social or human question involved, I would have taken out every particle of that uterus.

Dr. Hugo O. Pantzer, Indianapolis, Indiana.—What bearing the continuance of menstruation after partial hysterectomy has upon the health of these individuals, I cannot as yet answer to my satisfaction.

The importance of Dr. Werder's observations lies in the fact that he has greatly lessened the mortality when the uterus was not removed in whole. That makes a strong argument for his method. When we come to decide on operation on these cases, the question arises, shall it be a panhysterectomy or a supravaginal hysterectomy? In panhysterectomy parts are cut which are traversed by nerves and vessels contributing in common to the uterus, bladder, rectum and vagina, with the adverse consequence of materially damaging the nutrition and innervation of the bladder, the rectum and vagina forever afterward. As one effect of this must be designated the dry and itching vagina found in a limited number of cases which unfits these individuals for cohabitation. I recall the case of a woman, twenty-seven years old, who three years before I saw her, had all her genitalia removed on account of epilepsy. She came to my clinic where I repeatedly demonstrated her case to classes. She had marked atrophy of the vaginorectal and vaginovesical wall, accompanied with gross impairment of function of bladder and rectum owing to the dystrophia.

Dr. Ross McPherson, New York City.—Suppose a patient who has had plastic work of the kind described done on the uterus, does get pregnant, is she likely to have rupture of the uterus or can she carry the baby through? The latter seems to me to be very unlikely.

Dr. Julius H. Jacobson, Toledo, Ohio.—In reference to the *x*-ray treatment of fibroid tumors of the uterus, last year, after the meeting at Providence, Dr. McClellan and myself went abroad and we were very much impressed with the number of sloughing fibroid tumors which we saw operated in the clinics.

They were patients on whom *x*-ray treatment had been applied for the cure of the fibroid previous to operation. We got the im-

pression that when these tumors were treated first with the *x*-ray, the mortality from operation was much higher. I would raise the point that the *x*-ray treatment produces nutritional changes and brings to operation a larger percentage of sloughing and infected fibroids for which we are obliged to do a radical operation.

Dr. A. B. Miller, Syracuse, N. Y.—There is one phase of the subject of fibroid tumors of the uterus that has not been brought out, and that relates to the treatment of the advanced cases. I feel that Dr. Werder has brought before us a paper which is along progressive lines. While our fibroid tumors are innocent growths, and so common with women, yet they are capable of degeneration to such an extent that it is necessary for us to get at them and remove them as speedily as possible. In these days we see very few large tumors as compared with those we used to see, and if this line of treatment which has been practised by every one, namely, myomectomy, can produce the results that Dr. Werder has pointed out, we should take advantage of it. The line of thought I wish to take up in this connection is with reference to fibroids in advanced age. From the fact that the menopause does not cease, many women will either not accept an operation, or owing to their condition associated with heart disease, general debility and anemia, it is impossible to subject them to operation without mortality. I have had under my observation six cases that have been treated in the advanced stage by the Röntgen-ray. These patients are doing nicely; they have been under observation two years, some of them three or four months, but the menses have ceased, and these women in general condition have improved markedly. We have not had any degenerations attending them. To my mind the mortality would have been excessive had they been obliged to submit to operative intervention. I am hoping that some one who has had experience with the advanced cases may have something further to say in this discussion.

Dr. Werder (closing).—In answer to the question asked by Dr. Dickinson about embolic deaths, I wish to say that I have had probably four or five deaths from embolism. They are included in this 3 1/4 per cent. mortality, but I have only had one embolic death following myomectomy as far as I can recall, the others have been following hysterectomy.

In reply to Dr. Carsten who states that it makes no difference whether a woman menstruates or not, I must disagree with him. I am sure that these patients will also disagree with him because they are all anxious to retain their menstrual function above everything else, even if we are unable to save the power of reproduction. In the thirteen cases of resection, only five were sterilized, for the others pregnancy is at least a possibility. A woman whose uterus has been sacrificed will usually hesitate a long time before she consents to marry and probably few young men would be willing to enter the matrimonial state with such a woman. The retention of the uterus will make all the difference in the world in this respect.

In regard to the statement of Dr. Morris concerning danger of recurrence, I know of three cases of recurrence only after myomec-

omy. One case I operated nine years afterward and removed the uterus. The patient was a nurse. The first operation was performed when she was thirty years of age, the second operation at her thirty-ninth year of age. She has had about seven or eight years of perfect health between those two operations. While recurrences cannot always be prevented after myomectomy, they should not be common when the uterus is carefully examined and treated at the operation. With a resection such as described when the whole myometrium and endometrium down to the cervix can be thoroughly searched for the smallest nodules, recurrences should be very rare.

I fully agree with Dr. Pantzer in regard to pan hysterectomy. I do not perform that operation unless there is an indication for the removal of the cervix; a supravaginal hysterectomy answering every purpose without the objectionable features of a pan hysterectomy. I know there is objection to leaving the cervix on account of the possibility of cancerous development, but I have had only one case of cancer in the cervix after a suprapubic hysterectomy in my experience.

One gentleman seems to consider pregnancy a danger to these patients after myomectomy and resection. I have had at least a dozen cases of pregnancy following myomectomy and one patient mentioned in my paper has had four children since. These women went through labor as well as any others. There is absolutely no reason why pregnancy following resection should be more serious than that following a myomectomy.

I believe Dr. Miller's remarks in regard to the Röntgen-ray treatment is well taken. There are cases in which radiography is indicated in fibroid tumors of the uterus. I have one case under treatment by *x*-ray, the first of my cases so treated, she is very anemic and also asthmatic with rather bad kidneys. The operative risk of this case would be quite considerable, while with the *x*-ray treatment she has a fair chance of cure without such risk.

RESECTION OF OVARIES.

BY

A. GOLDSPOHN, M. S., M. D., F. A. C. S.

Prof. Gynecology at Post-Graduate Medical School; and Surgeon in Chief at the Ev. Deaconess Hospital,

Chicago, Illinois.

THERE is still too much difference of opinion in our ranks about follicular degeneration of the ovaries, as to its pathological status, its clinical importance and about the practical value of surgical efforts to preserve, reconstruct or improve such ovaries.

Too many men still look upon the ovary as a surgical *nolle me tangere*, where no intermediate surgical measures have a place between doing nothing and amputation. It is a long time since that policy obtained in the treatment of joints; and yet it is certain that ovaries are fully as susceptible to surgical treatment and as much in need of it as joints are, even though they be objects of lesser importance. It is not rational to assume that in ovaries no other pain-producing conditions occur other than acute inflammation or gross destruction by suppuration or by neoplasms. Such a rule does not obtain in any other part of the body. As clinicians we are supposed to feel with our patients; and we become traitors to them if we lend an indifferent or incredulous ear to their complaints merely because the microscope, in the past, has often been unable to reveal whether certain presumably pathological conditions caused pain or not. Aside from a few mere theorists, the general view of all men, who know the most about such ovaries from clinical experience and hystological studies combined, is that these enlarged atresic Graffian follicles and persistent corpora lutea, are retention cysts that have been prevented from rupturing and discharging their contents, normally, by the excessive amount of connective tissue in their walls or in the stroma and tunic of the ovary. These persistently growing follicle cysts cause increased intracapsular pressure within the ovary, which causes pain here as it does in other sensitive tissues of the body, when affected in the same way.

In my experience this condition has nearly always been merely an adjunct or secondary disorder, associated with other more pronounced pathological conditions. Careful attention to it, however, contributes much toward better and more uniformly good subjective results that the patients derive from the aggregate of surgical pro-

cedures that they undergo. The cases of prolapse of one or both ovaries without displacement of the uterus are few, but when they do occur, this follicular degeneration is usually present or it will soon follow; and such ovaries are as much an indication for surgical relief as if they were the seat of neoplasms. The objections that have been raised to resection of such ovaries are theoretical and practical.

(1) *Theoretical* objections were first formally raised in 1886 by William Nagel(1) an assistant of Gusserow, in declaring that all these follicle cysts no matter how large, contained ova and must therefore be regarded as normal and not be molested. But Nagel's premises and conclusions were soon completely overturned by Bulius, Stratz, Bollenhagen, Steffeck, Von Kahlden, Popoff, Pettipierre, Hölzl, Pfannestiel, August Martin and others who each made more exact and extended series of hystological investigations; and by eminent practical gynecologists like Von Winkle, Fehling, Fritsch, Gebhard, Hoffmeyer, Howard Kelly and others who have written about it. They have shown that Nagel jumped at unwarranted conclusions in trying to prove preconceived ideas; and he has never replied to the criticism that he received on this subject. Nagel's conclusion has since then been advocated with biased observations, by two others, under conditions that suggest chiefly a love for discord; while in 1904 an extensive series of hystological examinations of 180 such cases by Palmer Findley was published, who says: "The cysts varied in size from a pea to an English walnut, and in number from one to a score or more. These cysts, as Martin has pointed out, are not confined to the periphery of the ovary as is the case with ripened follicles, but are distributed throughout the stroma and may almost replace the stroma. On examination of these ovaries I have been astonished to note the scarcity of normal follicles with contained ova. In a few sections none were to be found and in nearly all they were fewer in number than would appear to be normal. The explanation probably lies in the atresia brought about by the addition of new connective tissue to the stroma, and its subsequent contraction. Hyaline degeneration is a prominent feature in nearly all sections. The walls of the blood-vessels, corpora albicantes, stroma and tunica albuginea all possess more or less of a hyaline deposit. This has been marked in the ovaries of young individuals. Congestion of the blood-vessels, while not constant, was a notable feature in almost all cases. Round-cell infiltration of the stroma was frequently observed." Findley says: "Numerous clinical and anatomical researches which have been made by competent observers prove the fallacy of Nagel's reasoning."

The practical objections to resection are: (*a*) That it is useless to remove follicle cysts, because, from the same cause more will form (R. F. Frank(2)) and (*b*) that the results are unsatisfactory, and re-operations become too frequently necessary (Hyde(3) four in twenty-one cases, and Polack(4) thirty-one in 200 cases). My further consideration of this subject will show that both of these statements are wrong: *First*, the usual cause of this follicular degeneration is a persistent venous hyperemia induced mostly by a downward displacement of the ovary, with or without a corresponding displacement of the fundus uteri. Correct surgical treatment eliminates this cause together with the resection. *Second*, that the results are not so discouraging, will appear from the experience of the majority of operators in this direction, and finally from my own results.

Importance of the Ovaries.—In order to weigh the merits of this procedure properly, it is important to note what loss of the ovaries means to the human female. Ovulation, with the object of reproduction, to comply with the demands of the state and to secure the happiness and physical development that maternity alone can bring, is one thing; but the other functions of the ovaries that are concerned solely with the physical and mental health and equilibrium of women is another thing, but of equal importance. Menstruation is not the indifferent or negligible process that exceptional opinions (Baldy(5)) would have it be. To preserve it in younger women, means to avoid the storm of distressing symptoms which are commonly associated with the anticipated menopause. It often means to avoid a wretched neurasthenia in young persons and a doleful melancholia in others. It helps very greatly, even when conception is no longer possible, to preserve the appearances of complete womanhood, to ward off domestic infelicity, and to hold a fair chance for matrimony and its legal perquisites still within reach of the patient. The internal secretion of the ovaries is an accepted fact, and it alone explains the following phenomena: Partly from clinical experience, partly from experiments upon lower animals (McIlroy,(6) Carmichael and Marshall(7) and others) and from at least four published cases of secondary abdominal operations (Holzbach(8)) and examinations of ovaries that were retained during previous hysterectomies, we know that the ovaries are needed, not only to obtain mature development of the genitalia and mammary glands at least, but also to save these organs from premature atrophy after their maturity; while on the other hand, the uterus and tubes may be removed, and the ovaries will still continue their functions. And they even figure in the general metabolism of the body if the statement of Richter is correct

that the exchange of gases (oxidation) is less in castrated persons; and the statement of Pilcher that the excretion of lime in the urine is diminished by half and the excretion of phosphorus is increased, when the ovaries have been removed.

It is germain to this subject to allude here briefly to a number of *pathologic liabilities of hydropic Graffian follicles and persistent corpora lutea*, that have been discovered or reaffirmed during the last decade. Hemorrhage from ruptured Graffian follicles and corpora lutea as one source of pelvic hematoceles is spoken of in the books of Carl Schroder, Pozzi, Nelaton and others that appeared before the lamented M. Saenger forcefully called attention to the predominance of tubal abortions as cause of these bleedings, in his classical paper on "The Active Treatment of Tubal Abortion" before the XI International Congress at Rome in 1894. After that time extrauterine pregnancy, in some form, was regarded by many, if not most, gynecologists as the sole cause of pelvic hematoceles; and this is the prevailing opinion still. However, this is incorrect, as the following observations show:

First, cases of pelvic hematocele, some of the patients fainting from loss of blood, have been operated upon, usually, by abdominal section, with the probable diagnosis of some form of extrauterine pregnancy; and the source of the bleeding was found to be from a ruptured Graffian follicle. A. F. R. von Winnewarter,(9) A. E. Neumann(10) and Gabriel(4) each report one such case, and Th. Holmes(12) reports two cases. Jayle,(13) Hannecart,(14) Kossmann (15) and Buerger(16) operated for such pelvic hematoceles and found the bleeding to come from a ruptured ovarian hematoma; and the follicular multicystic degenerated ovary is held by them as the most probable predisposing cause. W. E. Lunzer,(17) B. C. Hirst(19) and Reinhard(20) have operated upon such cases and found the bleeding to come from a ruptured cystic corpus luteum. S. Savage(21) reports six cases, arising from either ruptured Graffian follicles or corpora lutea. Reinhard reports one of such hemorrhage from a corpus luteum with an early tubal pregnancy, completely in tact, in the tube of the same side. Schauta(22) in two instances noticed large follicle cysts on an ovary while operating and left them alone. Some hours afterward he opened up the patients for evident internal hemorrhage and found it to come from those supposedly innocent follicle cysts which he had ruptured accidentally during the first operation. Pilliet(23) ascribes these ovarian hemorrhages to the small cystic degenerated ovaries, and corpora lutea in sclerocystic ovaries. He says: retrogression in these vulnerable bodies does not

proceed normally, but is diverted to cystic formation which predisposes to bleeding.

Cases of death from ovarian hemorrhage are recorded by Scansoni,(24) Hewitt,(25) Bandel(26) and by Penn;(27) and it was found to be the cause of death at postmortem, by Raquet,(28) Denonvilliers,(29) Puech(30) and by Caremee.(31) Many of these observers state that these ovarian hemorrhages occur during times of greatest vascular engorgement, as near the menstrual period, and are induced by exertion and excitement. Bartel and Hermann(32) made histological examinations of the ovaries of 119 individuals who bore stigmata of the status thymico-lymphaticus. They found that 58 per cent. of these ovaries were larger than the average, even to a length of 8.5 cm. as compared with a normal maximum of 4 cm. They had a thickened coat of dense fibrous tissue and a strikingly smooth surface, devoid of normal ovulation wrinkles, to the end of sexual maturity, in 63 per cent. Their increased size was due to the large number of atresic follicles, varying in size from a pea to a hazel nut, that were either grouped in the poles, or were distributed throughout the thickened subcortical layer. They say that corpora lutea were scarce and that Nagel's dictum about healthy ova in the follicles is false.

Anna Poetzl(33) under the head of small cystic degeneration of ovaries as a probable cause of uncontrollable uterine hemorrhages, made the following observations: Two years previously she had determined by very many blood counts made in numerous women at various periods in their life, that, normally, a marked rise of red blood cells occurs just before menstruation and a fall in their number soon after it—not due to the loss of blood. She made these counts also in various abnormalities, and reports four young nulliparous women from nineteen to twenty-eight years of age, with no traceable pelvic lesion, nor any constitutional condition to account for very severe metorrhagia, occurring periodically, every two months to two years, so severely that danger to life was iminent and death did ensue in one case. It was found by operation, and in one case by autopsy, that small cystic degeneration of the ovaries was present in each one. In one of these cases, a nurse, blood counts had been made during several years and it was found that the normal rise and fall of erythrocytes before and after menstruation did not occur, but a condition of hyperglobulia of irregular order existed. A curetment was first made in this patient with amenorrhea following for two months, but without improvement in her anemic and generally impoverished condition. Both ovaries were then removed, with immediate and

the most striking improvement in the blood findings, state of nutrition, strength and subjective feeling, and without a trace of climacteric symptoms. She supports her theory by the declaration of veterinarians that a "bawling sickness" in cows, which sometimes leads to a cachectic condition and occasionally to death, is caused by follicular degeneration of the ovaries; and that the condition may be relieved by crushing such ovaries, and cured by removing them. She says this condition causes sterility in both human and other females.

Experience and Resulting Opinions.—W. C. Seelye(34) in twenty-one patients, resected one ovary in ten, both ovaries in five, and removed one and resected the other ovary in six of them. The patients were young sterile women with severe dysmenorrhea. All except one were immediately and permanently relieved of severe dysmenorrhea and obtained painless intervals between periods. He says abdominal section for dysmenorrhea should be more frequently done; and that a better classification should exist, showing what the indications are in given cases.

J. E. Cannaday(35) says the menopause induced in younger women is distressing. A knowledge of no ovaries is frequently a source of mental disturbance and melancholia. When large follicles are distributed through the ovary, he splits it open, dissects out the follicles and unites the lateral portions with catgut. He says that in cases of larger cystic neoplasms a portion of the wall, bearing follicles near the pedicle, can sometimes be dissected out, rolled up and stitched like a sausage, in connection with the pedicle. He says: "I have practised conservative surgery in over fifty cases of ovarian and tubal disease, and as far as I have been able to follow my cases, the symptomatic results have been good. There have been no recurrences of tubal trouble. A very small number of cases of cystic ovaries has come to secondary operation for removal of recurrent cysts. Several pregnancies have followed resection of ovaries, but I have no record of a case of pregnancy following plastic work upon the tubes." B. M. Emmet(36) says this form of ovarian degeneration is caused by chronic inflammation and also by too frequent or too intense pelvic hyperemia, as occurs in sexual excess, unsatisfied desire, prevention of conception, suppression of menstruation from any cause, etc. He likewise recommends incising ovaries bearing multiple atresic follicles and closing the incision with fine catgut after the cystic follicles have been enucleated or dissected out. W. P. Manton(37) resected both ovaries in seventeen cases, and one in twenty-nine patients. He punctured both ovaries in twenty-two

cases and one in an equal number. In nineteen cases, one ovary was removed. Eighty-five per cent. of the married women and 75 per cent. of single patients were well one year after operation. In three cases he removed an ovary secondarily for recurrent cystic formations. He considers his results as satisfactory, and much better than total removal in view of the dual function of the ovary.

Edward Reynolds(38) bases his views in favor of resection upon twenty-nine closely observed cases. He says when one ovary is good and the other badly cystic, remove the latter. When one is less and the other more cystically degenerated, resect the better one first and if a fairly good ovary results, remove the worse one; but if a crippled one only results, resect the worse one also. Follicle cysts on the surface can be punctured and their lining peeled out. Corpus luteum cysts can often be extruded by pressure alone between the fingers. The remaining wounds he says, if not large will often contract and need no stitching. Also, from the wall of larger cysts it is often possible to save and reconstruct some of the expanded portion of ovary in the cyst wall, into a new one, by folding it upon itself. He has treated enlarged sclerotic ovaries with circular and cross-incisions; and whenever mere flaps remained, he has folded them up and held them by linen or silk ligature passed around the roll. He claims such ligatures to be as innocent as absorbable material. In this one point, and this one point only, as to nonabsorbable ligatures, I must differ with Reynolds positively. He regards the enlarged polycystic ovaries as the least auspicious for resection, but correctly advises the saving of a part of one when both are diseased. I would simply add that, securing such a remnant with its circulation unimpaired along with the fundus uteri well up out of the small pelvis, will prevent recurrence of the follicular degeneration. Palmer Findley and J. Clarence Webster, out of a total number of 180 cases in which resection occurred, reported the largest and most instructive existing collection of thirty-nine cases operated for resection of ovaries only or solely. "In every case pelvic pain was complained of. Tenderness was almost always elicited by pressure upon the affected ovaries. In eighteen of the thirty-nine cases there was dysmenorrhea, and in most of these cases the pain preceded the appearance of the flow and continued throughout the period." They together followed up and reported the results of forty cases of which the laboratory records show that nothing but ovarian tissue was removed, and found that four cases were reoperated for removal of the ovaries that had been resected; while thirty-six were successful.

My Own Cases.—During the past six months I have conducted a

persistent and very laborious inquiry, to find out the remote results of this operation, upon patients on whom it was incidentally (in each case) performed during the years 1907, 1908, 1909, 1910, 1911 and 1912. The total number of cases recorded is 151. Two other physicians and I succeeded in examining sixty-eight of them in from two to five years after operation. Inasmuch as the resection of one or both ovaries was done, in a large majority of cases, as an adjunct to some surgical procedure for correcting a faulty position of the uterus, which is of prime interest for the welfare of the ovaries; therefore "position" of the uterus and ovaries together was noted first, and secondly the "condition" of the ovaries together with the symptoms that might arise from them. When a patient, with full working or business capacity, would have minor pains during menstruation and merely slight indispositions from these parts, such women do usually not consult a doctor. They would be classed as "good" or "cured." Patients whose symptoms from these organs began to curtail their full business or working capacity, so that they would sometimes rest from duty, as during menstruation, or consult a doctor, they were classed as "relieved" only. And when such disability or ailment from this source was a daily or constant occurrence they were classed as "failures." Fifty-five of the examined cases were found to be with *position and condition good;* fourteen of them had both ovaries resected. Four of them have had a child since the operation, and one has had two children.

Ten of the examined cases were found with *position* good; but were classed as *relieved* only. Three of these had both ovaries resected. One girl was a neurasthenic with melancholic disposition when she was brought to me with congenital retroversion and a cystic descended ovary. Four years later the position of the parts was good and the condition fair; but she is classed as a failure because of a steady decline in her mental condition. The two remaining cases examined were reoperated recently, not for anything wrong with their ovaries, but in one a hysterectomy was done for a troublesome chronic metritis, her one remaining ovary being retained; and in the other one, also with only one ovary left, a resuspension of the uterus by the round ligaments was made for recurrence of retroversion, after two forceps deliveries and one septic puerperium intervened.

In twenty-five patients examinations could not be had; but detailed information was obtained about their subjective condition in answers, either to verbal questions or to an extensive question-sheet, by letter. In four of this number both ovaries were resected

and, likewise, four of them had a child. In nineteen of this number the reported condition of health warranted them to be classed as *cured;* while five were classed as merely *relieved,* and one as a *failure* because she reports that another operation was performed (not stating for what) and that she is still not well. One death occurred among these ninety-four total cases from peritonitis due to an unobserved puncture of the bladder, while ligating varicose veins in the broad ligaments, in connection with resection of ovaries, removal of appendix, and round ligament suspension of the uterus.

While half hour daily douches at 110 to 120° F., in recumbent posture, were freely advised for those classed as *relieved* and a smaller number of them were also treated by vagino-abdominal applications of the galvanic current (40 to 75 milliamperes) in seances of thirty minutes each, once a week, in no case has a resected ovary required surgical treatment subsequently.

That multicystic follicular degeneration of ovaries and persistent cystic corpora lutea are pathological can no longer be reasonably doubted. Several large follicles bulging forth from the surface of an ovary of normal consistence, with a fair prospect of rupturing, must, of course, be regarded as normal; but when numerous cystic follicles from 1 cm. in size upward are in evidence beneath the surface and distributed throughout the stroma, they should be regarded as pathological, especially when the tunica albuginea is dense, the consistence of the ovary tense and its outline inclines to globular form.

Causes are chronic inflammation of infectious origin with or without active hyperemia as from excessive venery, incomplete coitus, masturbation, suppression of menstruation from a cold or from a mental trauma, etc.; or connective-tissue hyperplasia from persistent passive hyperemia which is induced in these parts by constipation, vicious dress, sedentary employment, etc., but above all things, by descensus or prolapse of the ovary caused by uterine displacement. (See C. H. Stratz,(39) and "The Fate of Ovaries in Connection with Retroversion and Retroflexion of the Uterus," Goldspohn(40).)

Treatment.—(*a*) Remove general causes by ferreting out contributory evil habits of living and any harmful features in employment, and point them out for correction. (*b*) Relieve the ovary of its tension by enucleating or dissecting out the growing cystic follicles by a most careful technic; and then secure it in an elevated position with and upon the broad ligament well drawn out of the small pelvis, preferably by some form of transplantation of the round ligaments into the abdominal wall. Care must be taken not to impede

its circulation. The principal cause—venous engorgement—now having been removed, follicular degeneration will usually not recur.

The indication for this treatment is governed by the age, general health, occupation, social and economic relations, and by the wishes of the patient. With Reynolds, I would say "From puberty to maturity the tide of sexual life is rising. To dam it suddenly spells a neurasthenic catastrophe in a high percentage of cases." From twenty-five to thirty-five the tide is full and just as important; but not so many wrecks follow removal of the ovaries. After forty, the functions of the ovaries have mostly ended; and removal rather than resection should be the rule. Persons to whom constant wages are a necessity are sometimes better served by smaller risks of conservative surgery. This small but punctilious operation has, in my experience, been an incidental one, and this chiefly in connection with surgical treatment of uterine displacements, and less with operations for pelvic neoplasms, appendicitis, tubal pregnancy and old inflammatory conditions in the adnexæ. When old pus was in evidence in one or both tubes that were usually removed, I have practically always preserved one, or a part of one ovary, sometimes with ignipuncture of follicle cysts in such cases; and in all but 12 per cent. of this entire class of border-line infectious cases; menstruation has also been preserved by retaining at least the body of the uterus—always in high suspension.

My technic has been first to carry out that more perfect form of asepsis which is regarded as essential to success in bone plastics, to use fine nonchromic catgut only with fine round needles, curved or straight, according to the accessibility of the little wound. Corpus luteum cysts are easily enucleated from a linear incision over their most prominent part. Follicle cysts are removed mostly by taking out a wedge-shaped section of the ovary which is so placed that it will either remove or cut open the maximum number of follicles. From the resulting wound or from a median incision of sufficient depth, the remnants of cysts and others still unopened are peeled out or rubbed out with a bit of gauze, after they have been incised. When needed, the edges of the wound are trimmed and it is then usually closed by two rows of continuous sutures, one deep enough to control the bleeding, and a return row to coapt the edges. Hard cirrhotic portions are similarly exsected. In a number of instances, in removing cystic neoplasms, I have preserved a disc of cyst wall in connection with the pedicle, when Graffian follicles could be seen in it, and have rolled it up and stitched it together, with menstruation continuing more or less regularly, in each case. According to

Zacharias(41) Menge has gone further and done the same thing even in cases where no follicles were visible macroscopically, and also obtained a return of regular menstruation after three to six months following the operation, in three reported cases.

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DISCUSSION.

Dr. Francis Reder, St. Louis, Mo.—This is an exceedingly interesting subject to me. I am very glad the doctor mentioned the neurasthenic condition with reference to these cystic ovaries. If the nervous state is permitted to go on to the extent we have during neurasthenia, it is hardly worth while to do anything for the patient. Patients with such cystic ovaries are very irritable. Let us take school teachers, for instance, they can assign no other cause for the irritability except they are disturbed by a pupil turning a page or the leaf of a book unnecessarily, or these patients will drop their work because they are tired. Such conditions can be traced to a cystic condition of the ovaries. The question in my mind has been, how long such a condition holds good, and how far can we go by operative intervention with the ovary. The ovary normally is as large as an almond without the shell, but I have quite frequently seen ovaries that were from three to four times larger. The mere breaking of the ovary will demonstrate that there is a cystic condition. The resection of the ovary sometimes brings it down so that you can see macroscopically you are in healthy ovarian tissue, and thus relieve the condition.

The etiology of such an ovarian condition has been very interesting to me. The doctor has made it clear that the decensus has to take place to interfere with the circulation, and the cystic processes, together with possibly other processes, will have their origin in the ovary.

Dr. Hugo O. Pantzer, Indianapolis, Ill.—Dr. Goldspohn has brought us a good deal of important material for reflection. Where follicles cannot rupture on account of the thickened albuginea, I pare off the thickened tunica. In some cases additionally I bisect the ovary longitudinally and resew it, trusting that the ensuing scar will be more yielding to the intraovarian pressure incident to follicular development than will be the sclerosed tunica albuginea.

The subsequent course of these cases at times is highly gratifying. Immediately these patients regain nervous equilibrium, and menstruation is improved so as to distinctly indicate a relation between the operation and the subsequent course.

Let me mention a case that I have referred to before on occasions like this. A young woman married eight or ten years, was anxious to have offspring. But her suffering at the monthly period was such through many years that she asked to have relief at any expense. When the abdomen was opened, very small, hard ovaries were found. I bisected one and condemned it to removal as being hopeless of ever functionating normally. There was practically only scar tissue, no macroscopic evidence of an ovum bearing zone. Acutely conscious of the strong desire of the patient to have offspring, I was tempted to save the other though like unpromising ovary. I cut off each side a big ledge of the thickened tissue, leaving only a small pyramidal jut of ovary. Three months later I was informed that the patient had flowed freely every four weeks without pain. Six months after this the patient reported a relapse. Two periods had passed with some

pain and sparse flow, and since she had gone several months without any flow, the patient was greatly distressed and expressed the fear that another operation would be necessary. My examination revealed a pregnant uterus of several months. The patient went to full term, and the letter she wrote me when her delivery of a fine child had been effected was the most grateful expression I ever received. Since then I have practised paring the sclerosed ovary in women of the child-bearing period, with a fair success, warranting the continuance of this procedure in appropriate cases.

Dr. Frank D. Gray, Jersey City, N. J.—I desire to cite the clinical course of one case as evidence of the fact that these cystic ovaries have a symptomatology, and also the fact of how little ovarian tissue, left behind will suffice to maintain function.

A married woman, aged twenty-two, came under my observation three years ago, having had a severe attack of pain in the lower right quadrant of the abdomen. I made an error in diagnosing the case as one of appendicitis. I found she also had a quite movable kidney. I opened her abdomen and found a normal appendix. However, I removed it and did a nephropexy. I had an opportunity to see the right ovary which, to all appearances, was normal. I did not see the left. Vaginal examination did not reveal anything wrong with the other ovary. Following that this young woman had a series of the most extreme crises I have ever observed. She would, at intervals of one to three months, have the most terrific pelvic pains she would go into collapse and seem as if she was about to expire. I finally made a vaginal examination and found evidences of a large left ovary. I opened the abdomen again, and found an ovary that resembled nothing so much as a bunch of white grapes, and there was no ovarian tissue left. I removed it. The other ovary in the meantime (this was a year after the first operation and, the ovary which I had then seen and handled and was apparently normal) was in the same condition, but I was able to find a tiny piece of apparently good ovarian tissue that was not larger than a pea near the hilum of the ovary. I resected the ovary and left the good fragment. She has been absolutely free from her crises; she has menstruated (rather profusely) since the operation, and I think the case is interesting as showing that these ovaries do have a decided symptomatology, and that a very tiny bit of ovary left will continue to functionate.

Dr. Goldspohn (closing).—In my own work, resection of ovaries has been in all cases associated with other surgical acts, and mostly to correct the position of the uterus. I would not resect an ovary unless I took good care of it, got it up out of the pelvis; and the higher up you get it out of the pelvis the more comfortable it is. I have about 1000 cases to endorse that statement. We must correct the position of the uterus usually, when septic ovaries are present, and we elevate the ovaries in the same act. I would rather correct the position and not resect than to do the reverse. But I have the feeling that has grown on me from an experience with a large number of cases, that these women are more comfortable if we do away with the evil results of dislocation of the ovary, by removing the cystic follicles;

and when the cause, *i.e.*, the descensus is overcome by securing the uterus and ovaries in good position, the follicle cysts will not reform.

It might be thought that I have been whittling on a lot of easy cases to get my statistics. To overcome that objection, I will give you a little insight of the remainder of the material. For the years 1907, 1908, 1909, 1910, 1911 and 1912, I looked over my records, and excluded, in the first place, those cases that were out and out pus cases, cases in which any man would remove the uterus and appendages. Then I excluded tubal pregnancies, and excluded all the cases of neoplasms of any kind. That would leave the class of chronic infective cases where the infection had died out; and of that number there were 298. In that number I did hysterectomy in 12 per cent. I believe the custom with most gentlemen would be a higher percentage than that where they are in the habit of taking out the uterus more frequently. But I treated the worst metritic uteri with galvanism afterward. When the uterus is suspended with the fundus near the abdominal wall, and the cervix is amputated as should be done, that uterus can litterally be seized between the poles of the battery. If you want to do the best you can for the patient, you curet, amputate the cervix, take out the diseased tubes, and the worst ovary, leaving one ovary or part of one to keep up menstruation. I can subscribe to what Dr. Werder has said in regard to the social relation. If the patient becomes a widow and menstruates she is still a candidate for matrimony, and in her mind it makes an awful difference whether she menstruates or not. Suppose that fundus uteri is now a chronic metritic affair and does not change by being hung up, you can put the galvanic current through it making the uterus the connecting link between the two poles. You can put a hundred milliamperes through there. Do that ten or twelve times for half an hour, a week apart, and the chronic metritis will behave itself and the patient will menstruate and be well also. I do that in order not to have to do a hysterectomy, and not to regret leaving the uterus. There were in that entire number only three patients (1 per cent.) who retained the uterus without ovaries, *i.e.*, without menstruation; and the total mortality in that number was 1.7 per cent.

OBSERVATIONS OF TORSION OF OVARIAN CYSTS WITH REPORT OF CASES.[1]

BY

K. I. SANES, M. D., F. A. C. S.,

Pittsburgh, Pa.

An ovarian cyst has all the mechanical conditions favoring torsion. It is freely movable and is attached to a more or less fixed base by a pedicle. The exciting causes of torsion are intra- or extraabdominal, some of which act suddenly, others gradually.

The sudden factors may be based either on strained muscular actions such as lifting, stooping, movements in bed, getting out of bed, etc., or on rapid changes in the volume of surrounding organs, such as the evacuation or distention of bowels and bladder, expulsion of child from a pregnant uterus, etc.

The gradual factors are difficult to define in individual cases, but can be readily understood in a general way. The unequal growth of the different loculi in a multilocular tumor and the tendency of the largest one to occupy the concave anterior abdominal wall; the gradual rise of the growing cyst from the small pelvis and its unavoidable, inevitable tendency to fall forward; the gradual increase in size of neighboring organs, such as the pregnant uterus and growing pelvic tumors—all these factors act on the cyst gradually and sometimes imperceptibly until a torsion of sufficient degree is induced to bring about disturbing symptoms.

Torsions, whether sudden or gradual are at least of 180°. A twist of less than that does not interfere with the circulation of the pedicle and therefore does not cause any disturbances. It should be remembered, however, that a turn below 180° may, by the increase of venous pressure in the pedicle, favor a gradual development of torsion. This point has been proven by Edwin Payr(1) who experimentally induced torsion in different organs by increasing their venous pressure. He showed that if the veins of a pedicle become engorged, torsion may go on without any other additional force. It is well known that the veins of pedicles are longer than the arteries associated with them and that their walls are thinner and stretch easier than the more muscular walls of the arteries. A slight pressure on a pedicle insufficient to interfere with lumen of its artery, may be sufficient to compress the veins, bring

about their dilatation and elongation, and cause them to describe a spiral around the unchangeable parts of the pedicle, the connective tissue and artery. Such spiral turns of the veins may, according to Payr, carry the cyst, if not too large, around the pedicle and bring about torsion.

With so many factors favoring torsion, we should find it to be a frequent complication of ovarian cyst.

Going over our operative records for the last five years we found in fifty-one operations for ovarian cysts nine cases of torsion, or 17 per cent. F. Schauta(2) gives his percentage of torsion in ovariotomies as 23 per cent. and M. Hoffman(3) as 9 per cent. J. Pfannenstiel(4) while giving an average of 20 per cent., calls attention to the great variation in the percentages in the various clinics (from 47 per cent. in B. Kustner's clinic to 5 per cent. in A. Martin's), and explains this variation by the different degree of readiness with which patients apply for operative relief from uncomplicated ovarian cysts.

The statistics just cited show that torsion is a very common complication in ovarian cysts, and therefore deserves more attention than it has been receiving in text-books and from writers in general.

Before going on with the subject we shall first cite briefly the histories of our cases.

Case I.—Mrs. A. K. Patient of Dr. B. B. Wechsler, twenty years old. Married two years, one child one year old. Menstruation regular and normal. For last three or four months the patient was suffering with severe pain in left ovarian region, radiating to the left hip. The pain was almost continuous and was frequently accompanied with chills. The day before admission to the hospital the patient was seized with a very severe pain in the left ovarian region, which could not be relieved by the usual anodynes. In addition to the pain she suffered from nausea, constipation, fainting spells and nervousness. On admission to the Montefiore Hospital, September 18, 1909, pulse was 92, temperature 100°, respiration 24. Her abdomen was tender especially on the left side, but not rigid and a tumor could be made out in the hypogastrium. On bimanual examination this tumor was found tense and very painful. Its mobility could not be established on account of pain. The uterus was retroverted and the right ovary prolapsed and cystic. A diagnosis of a possible localized pelvic peritonitis with tuboovarian abscess was made.

Operation Sept. 18, 1909. A preliminary posterior-colpotomy for exploration and drainage was made and bloody serum escaped through the incision. A dark-looking cyst was exposed with retractors and diagnosis of torsion of ovarian cyst was made. The tumor was found inaccessible through the posterior culdesac

and laparotomy was therefore performed. A left-sided parovarian cyst, not adherent, lying above and in front of uterus, twisted on its pedicle one and one-half complete turns, was found. The pedicle was ligated and tumor removed in the usual manner.

The tumor, conical in shape, 6 × 4 × 3 inches, presented a thin almost transparent wall. The vessels of the walls were dilated. The tube, except for the small part used in the pedicle, was drawn over two-thirds of the surface of the tumor and did not show any marked changes. The pedicle consisting of the inner part of the tube, broad ligament and ovary with its ligament was dark greenish in color and the ovary on section presented normal tissues with hemorrhagic spots regularly distributed through it. The fluid within the cyst cavity was clear and slightly bloody. The inner surface of the cyst presented very few deviations from normal. Torsion of parovarian cyst. The patient made an uninterrupted recovery.

Case II.—Mrs. A. S. Case of Dr. M. G. Schlotbom. Fifty-three years old, seven children, the youngest ten years old; menopause five years. Patient has been complaining off and on for over a year of abdominal pain. The pain usually beginning in the epigastrium, radiates to the pelvis. It is accompanied by gastrointestinal disturbances and is aggravated by constipation and exertion. These disturbances lately have been becoming more severe. She also noticed lately a gradual enlargement of the abdomen. For the last two days patient was confined to bed.

On admission to the Western Pennsylvania Hospital, March 21, 1911, the abdomen was found tightly distended by a big mass tender to touch, filling the whole abdomen. Temperature was 102°, pulse 110, respiration 20. She looked toxic and her blood showed 1,650,000 red cells, 11,800 leukocytes, 70 per cent. hemoglobin; urine was negative. On vaginal examination the uterus was found small and low, adnexa could not be mapped out on account of the tumor filling the pelvis and abdomen. Diagnosis of torsion of ovarian cyst was made.

Operation March 21, 1911. Laparotomy. Bloody serum found free in the abdominal cavity. Parietal peritoneum looked normal. A large tumor was exposed, dark greenish in color. It was twisted three complete turns on the axis of its pedicle, which consisted of the right tube and ovarian ligament. Extensive adhesions to the omentum were found and freed. The cyst being too large to be delivered through the incision, was emptied with a trocar and 4000 c.c. of bloody fluid was collected. The pedicle, the size of a finger, was ligated, and the tumor removed. The tumor was a unilocular cyst. Its interior presented in places hemorrhagic and exudative deposits; necrotic spots were found in many places. Torsion of a unilocular glandular cyst. The patient continued toxic the first week after the operation, but made a good recovery and was discharged May 2, 1911.

Case III.—Mrs. A. M. Aged twenty-seven years. Married nine years. Has four children, the youngest six months old. Is nursing her child and therefore has not menstruated for about

fifteen months. Has dysmenorrhea, otherwise the periods are normal. Since childbirth six months ago patient has had five attacks of pain in left lower quadrant accompanied by vomiting and weakness and insomnia. The previous attacks were sufficiently severe to confine her two or three days in bed. This last attack came on July 20, 1912. It began with sudden severe pain in the left ovarian region, nausea, vomiting, constipation and abdominal distention.

On admission to the Western Pennsylvania Hospital, July 23, 1912, the patient's temperature was 98.4°, pulse 80, respiration 22. The abdomen was rigid and distended by a large tumor extending from the pubic region to above umbilicus. It was tender on pressure and not movable. On vaginal examination the uterus was found replaced backward and somewhat to the right. The right ovary was mapped out and the left one was not. The mass felt somewhat fluctuating. Diagnosis of torsion of cyst was made.

Operation.—July 25, 1912. Laparotomy. Large abdominal incision. A large ovarian tumor was exposed. The entire anterior wall was covered by the adherent omentum and two loops of small bowel were firmly adherent to its left side. The adhesions were freed. The tumor was found greenish gray in color and in places necrotic. The pedicle was twisted three times, two turns must have been from previous attacks, for after separating the omentum from the anterior wall of cyst, a separate omental band was seen adherent to innermost two twists. The tumor was removed in the usual manner.

The tumor 8 1/2 × 8 × 6 inches was dark gray color. Its pedicle was short and consisted of inner side of tube, broad ligament and ovarian ligament. The tube and ovary were lying in normal relations to each other and uterus. The ovarian cyst was comparatively thin walled, unilocular and contained 1600 c.c. of thin dark brown fluid. The interior of the cyst was of light gray color, hemorrhagic in places. The ovary microscopically showed immense distention of the blood-vessels. Torsion of an intraligamentous cyst. The patient recovered without any complications, except that she had to be catheterized eleven days after operation. She was discharged August 16, 1912.

Case IV.—Mrs. M. R. Patient of Dr. Bixler, thirty-three years old. Has three children, the youngest twelve months old, still nursing. Her menstrual history is normal. Last period twenty-one months before present illness. Pregnancy and nursing. Patient has had pain in the left side for a few months. August 10, 1912, late in the evening, after a long horseback ride in the country, she noticed a slight bloody discharge from the uterus. Early the following morning getting out of bed the patient was seized with a sudden sharp pain all over the abdomen, so severe that she could not move. The pain was continuous. Her abdomen became distended but there was no vomiting. When seen in the evening her temperature was 100.2°, pulse 100, respiration 24, leukocyte count 24,000. Her pain was excruciating. On examination the abdomen was found

rigid and exceedingly sensitive to touch. A round mass regular in shape could be mapped out.

The patient not being aware of the existence of a tumor and her case having been diagnosed as chronic appendicitis on previous and different occasions, there arose a question in diagnosis between pregnancy with acute appendicitis and torsion of cyst. On account of the great tenderness, a bimanual examination was made under ethyl chlorid anesthesia. The uterus was mapped out and found normal in posterior portion and left ovary prolapsed. Diagnosis of torsion of right ovary was made.

Operation at the Western Pennsylvania Hospital, August 13, 1912. Laparotomy. A large cyst about the size of uterus at full term, twisted twice on its pedicle, consisting of the tube and ovarian ligament, was found. The parietal peritoneum was dark red in color. There were no adhesions, but some free yellowish-brown fluid in the peritoneal cavity. The tumor lay more on the right side and a partial turn of the tumor toward the left was necessary for its delivery. Clamps were applied to the pedicle before ligature and the tumor was removed. The tumor 9 × 6 1/2 × 5 1/2 inches was dark blue in color, irregular in its wall thickness, consisted of two cavities both of which were filled with pseudomucinous contents mixed with blood. The tube was about 4 inches long and 1/2 inch thick. Its fimbriated parts were free and open. The interior of the cyst was dark red. Torsion of multilocular glandular cyst. The patient made an uncomplicated recovery and was discharged September 2.

Case V.—Mrs. M. L., Chickory, Pa. Aged twenty-seven. Married nine years. One child eight years old (preventing conception). Menstruating every two or three months, scant flow, severe dysmenorrhea, last period five months ago. For the last four or five years patient has been having occasional attacks of severe pains in the left side. During the last two weeks she had two attacks of severe pain in the left side of abdomen which radiated to the hip, thigh, vagina and settled in the pelvis. She was chilled and vomited a few times with the pains. She experienced a great deal of pressure on the rectum and was constipated. Urination was difficult and painful.

On admission to the Montefiore Hospital, May 27, 1913, the temperature and pulse were found normal, her general condition was good. There was some tenderness on pressure over the left ovarian region and a tumor could be felt in the hypogastrium. The bimanual examination showed a large uterus of about four months, pregnancy and a hard conical immovable tumor wedged into the left side of the posterior culdesac. The diagnosis of a pregnancy with left-sided mass was made and a vaginal exploratory operation decided upon.

May 28, 1913, a posterior colpoceliotomy was made. A reddish fluid came away from the incision. A dark greenish conically round tumor was exposed. So firmly and completely was it adherent to the pelvic wall that it looked like an extraperitoneal

growth. After separating it from the adhesions, it proved to be a twisted cyst. The pelvic cavity was carefully walled off with vaginal pads and the cyst exposed. With a Record syringe introduced into the tumor a fluid was obtained which proved to be the contents of a dermoid cyst. The wall of the cyst was grasped with two Allison forceps. A small incision was made between them. The contents of the cyst consisting of sebaceous material and hair was removed, care being taken not to soil the peritoneum. The opening was then clamped and ligature applied to the twisted pedicle after compressing it with forceps and the tumor was removed. The colpoceliotomy incision was closed, leaving a small opening for iodoform gauze drainage.

The tumor was about 6 inches in its longest diameter and its color dark blue. In places it was raw, presenting here and there areas of necrosis. The pedicle, consisting of the uteroovarian ligament tube and broad ligament, was bluish and its twists were adherent. The number of twists could not be made out. The interior of the cyst was rough reddish in color and in places covered with fine hair. Torsion of a dermoid cyst. The patient made an uninterrupted recovery and was discharged from the hospital May 21, three weeks after the operation.

October 23 the patient was normally delivered of a healthy boy. Except for a mild phlebitis, puerperium was normal.

Case VI.—Mrs. J. E. Aged twenty-sevn. Patient of Dr. J. M. Jackson. Married six years, two children, one miscarriage before the first birth. Youngest child two years. Menses slightly painful, otherwise normal. Last period Sept. 15, 1913. About the end of June patient had an attack of severe abdominal pain, chiefly on the left side. The pain lasted a day and never occurred again until Sept. 25, when getting out of bed in the morning she was seized with the same severe pain and vomiting. The pain continued in the same location for about one-half day and then settled low in the pelvis. During the attack the patient was badly constipated and complained of frequent and rather difficult urination. There was abdominal tenderness but no rigidity.

On admission to the Western Pennsylvania Hospital the pulse was 92, temperature 100°, respiration 22, leukocytosis of 18,000. A left-sided irregular mass extending from the pelvis to the level of umbilicus was found. The mass was tender to the touch, tense and slightly movable. On bimanual examination the fundus of the uterus was found displaced backward and somewhat toward the right side; the right ovary was easily palpated; the left ovary was not found. A diagnosis of torsion of left ovary was made.

Operation.—October 2, 1913, seven days after last attack. Postcolpotomy. Free brown fluid found in the pelvis. Mass could not be reached through vaginal incision. Laparotomy was performed. A dark red left ovarian cyst somewhat oblong firmly adherent to the sigmoid and bladder was found. It was twisted from right to left twice on its dark pedicle, consisting of ovarian ligament and tube. The pedicle was compressed with a clamp and

ligated in the compressed band thus formed. The tumor was removed and additional ligatures applied for safety to the individual blood-vessels.

The tumor was a unilocular parovarian cyst of dark red color, somewhat oblong, 8 × 6 × 5 inches. The dark red pedicle consisted of the inner side of tube and ovarian ligament. The tube was about 3 1/2 centimeters in diameter; its outer portion was flatly drawn over the surface of the tumor about three-fourths of an inch wide with the fimbriated end open, but spread out for a distance of about 2 inches. The interior of the cyst was almost of the same color as the external surface, dark red, and its contents were a clear, thin and reddish fluid. The ovary was reddish black, slightly enlarged, lying in proximity with the pedicle, and microscopic examination by Dr. V. L. Andrews showed it to be so infiltrated with blood that very little ovarian tissue could be found. Torsion of an intraligamentous cyst. The patient made an uninterrupted recovery and was discharged October 29, 1913.

Case VII.—Mrs. A. W. Patient of Dr. S. Zabarenko, thirty-five years old, weight 240 pounds, married seventeen years, has one child fifteen years old. Her menstruation has always been normal, last period January 1, 1914. Four months ago on rising she had an attack of abdominal pain, nausea, vomiting and tympany. Her pulse and temperature were then normal. She was confined to bed only two days. Three days before admission to St. Joseph Hospital, on getting out of bed, she was seized with epigastric pain which later shifted to the right inguinal region. The tumor, the existence of which was known to the patient for a number of years, began to rapidly increase in size. Gradually the temperature and pulse went up; dryness of tongue, anorexia, restlessness, insomnia and obstipation developed, but there was no vomiting. The abdomen became more and more distended, rigid and tender.

On admission to the St. Joseph Hospital the patient looked toxic. The abdominal mass was found filling the entire abdomen. Her temperature was 101°, pulse 120, respiration 30. On vaginal examination the uterus was found anteverted and the lower part of the tumor filling the pelvis behind it. Diagnosis of torsion of cyst was made and the operation was performed Jan. 14, 1914.

Laparotomy.—Bloody fluid was found in the peritoneal cavity. The peritoneum was deeply injected. A few omental adhesions to the tumor were found and separated. The tumor was a large left ovarian cyst, dark red in color, twisted one complete turn from right to left. It was untwisted a half turn in order to deliver it through the incision. The pedicle consisted of the ovarian ligament, inner part of tube and broad ligament, was clamped and tumor removed; the vessels of the stumps isolated and ligated; the broad ligament sutured and abdomen closed.

The tumor, oval in shape, weighed 9 1/2 pounds; 10 × 6 × 8 inches in size. It presented bluish-red appearance and in places glistening pearly gray, rather regular in contour. The tube 7 1/2 inches long and three-fourths of an inch thick was of dark

red color, its fimbriated extremity spread over the cyst and open. The mesosalpinx was markedly thickened. The interior of the cyst held 2000 c.c. of blood-stained pseudomucinous fluid and presented one large cavity into which projected a mass composed of a fine honey-combed meshwork of small cysts with mucinous contents separated by very thin septa. The interior of the cyst was dark red almost black. Torsion of multilocular glandular cyst. The patient made an uninterrupted recovery and was discharged February 5, 1914.

Case VIII.—Miss J. L., Case of Dr. J. M. Jackson, twenty-two years old. Single. Menstruates regularly, last period January 10. Patient has been having dull pain in right ovarian region for several years. Four months before admission to the hospital she had an attack of sharp pain in the right inguinal region and was confined to bed for over a week with a diagnosis of appendicitis. January 30, while walking up a hilly street, she was seized with a sharp sudden pain in the right side which lasted only a short time. During the night she was awakened with a severe pain of the same nature. She soon became nauseated and vomited. There was then no temperature nor leukocytosis. During the next day patient noticed, for the first time, an abdominal tumor, reaching the level of the umbilicus by the next evening.

On admission to the Montefiore Hospital, January 31, 1912, the abdomen was found distended on the right side by a tense smooth mass which was tender on pressure and somewhat movable. On rectal examination the mass was found somewhat fluctuating, independent of the uterus which was found normal in size and retroposed. Diagnosis of torsion of right ovarian cyst was made, and an operation advised.

Laparotomy January 31. No fluid was found in abdominal cavity. A right ovarian cyst size of a cocoanut of bluish color, smooth, without any adhesions, twisted in two complete turns from left to right on a pedicle, consisting of the ovarian ligament and internal portion of tube, was found. The tumor was delivered in its entirety through the incision, was untwisted and removed.

The tumor wall was of dark bluish color, unilocular, thick with hemorrhagic infiltration; the intracystic fluid was serous and bloody. The interior was smooth dark red. The pedicle was also dark color; the tube was drawn over the greater part of the tumor, its fimbriated extremity lying flat on the cyst. Torsion of parovarian cyst. The patient was discharged as cured February 22, 1913.

Case IX.—Mrs. E. B. S. Case of Dr. Lawrence Litchfield. Aged thirty-five. Five pregnancies. Two miscarriages. Youngest child five and one-half years. Since childbirth coitus reservans to prevent conception. Menstruation regular until the last year when she began to menstruate every three weeks. Last two months menstruation has been regular again. Last period three weeks ago. Patient has been having for the last two years off and on pain in the lower left side of the abdomen with radiations to the left lumbar region

and the inner side of thigh. She had four rather severe attacks. The first one two years ago lasted about one-half day; the second four months ago just a few hours. These two attacks were rather mild. The third one two months ago was very severe and came on while getting out of bath tub shortly after cessation of menstruation. This attack confined her to bed three days. She had then a rise of temperature. Her pain in the left gluteal region radiated down to the hypogastrium and the left thigh and was especially severe the first two days. She vomited once. During this attack she noticed a tender mass in the left side below umbilicus. Since the second attack this mass seemed to appear and disappear and only bothered her occasionally when she put her corsets on. The last attack of pain began five days ago in the same location as in the previous attacks, but two days before admission to the hospital the pain shifted to the umbilical region. This last attack was not as severe as the third one and did not confine her to bed.

On admission to the Montefiore Hospital, Sept. 4, 1914, the temperature was 100°, pulse 90. On examination an abdominal movable tumor could be mapped out reaching above umbilicus. It was slightly fluctuating, not painful to touch and resembled a pregnant uterus. On bimanual examination the uterus somewhat movable could be mapped out in front of this mass. The ovary on the right side felt normal. A diagnosis of torsion of left-sided ovarian cyst was made and immediate operation advised.

Operation.—Sept. 5, 1914. Laparotomy. About 6 ounces of light reddish fluid was found in the abdomen. A left ovarian cyst twisted three times on its pedicle from right to left was found. There were no adhesions. The pedicle consisted of the thickened tube, fixed to the tumor, but its fimbriated extremity was free and patulous. The ovarian ligament constituted a part of the pedicle and was enlarged. The tumor was untwisted from left to right without emptying it. It was ligated and removed in the usual manner. Chronic appendicitis with adhesions was found and appendectomy performed.

The tumor was dark red in color at its upper part. The posterior wall was grayish color with very many irregular hemorrhagic spots. The pedicle was also grayish. The tumor was conically shaped, 10 inches in its longest and 6 inches in its widest diameter. The vessels were found very much distended. On opening it 32 ounces of thin sebaceous fluid escaped. In the sack were found two balls of dark hair about 3 inches in diameter and a mass projecting from the inner wall with two knobs all covered with thin hair. The whole interior was deep brownish dark color. Torsion of a dermoid cyst. The patient made an uninterrupted recovery.

Going over our own cases as well as cases collected from the literature we find that torsion most frequently occurs in multipara. Out of thirty-one cases in which the number of births are specified, seventeen (about 55 per cent.) are multipara, eight (about 26 per cent.) nulliparæ and six (about 20 per cent.) primiparæ.

The most common age for torsion is between 20 and 40. The youngest we found in literature was two years old,(5) the oldest sixty-seven.

Torsion was found to occur more frequently on the right than on the left side, the proportion being 3 to 2. Tait attributes the greater frequency of right-sided torsion to the alternate filling and emptying of the rectum.

PATHOLOGICAL CHANGES IN THE TWISTED CYSTS.

When an ovarian tumor twists itself upon its pedicle in a degree sufficient to obstruct the return circulation, definite pathological changes take place. These changes are usually slow in their development and vary in accordance with the degree and rapidity of torsion.

As a result of torsion the veins and lymphatics of the pedicle become compressed and venous stasis is gradually introduced. With the appearance of stasis, hemorrhages and transudation of serum take place within the wall and cavity of the twisted cyst. The wall assumes a dark blue or dirty brown color and the cystic fluid rapidly increases in quantity and becomes bloody. Under such conditions, especially after the obstruction of the arterial blood supply a necrotic process is introduced unless it be checked by the formation of adhesions. This formation of adhesions is brought about by the areas of raw surface on the cyst resulting from destruction of its superficial epithelia. These raw surfaces becoming attached to neighboring organs bring about adhesions which reestablish the circulation and cut short the destructive process in the cyst. When adhesions do not form and necrosis occurs a fatal toxemia from absorption of the necrotic products follows. Occasionally, however, the contents of the necrotic cyst become absorbed and its tissues calcified or the cyst tears itself off from its pedicle and becomes adherent to surrounding organs. Under such conditions the necrotic process is arrested and the cyst remains harmless in the peritoneal cavity. In this connection, it is interesting to note the case of Hausman in which a torsioned cyst tore itself loose from its attachment, formed adhesions to the omentum and later became twisted upon the newly formed omental pedicle.

THE SYMPTOMATOLOGY.

The symptomatology, judging from our cases and from the study of the literature, does not seem to be in direct relation to the extent of the pathology found in the cysts.

In some cases the symptoms of torsion come on suddenly—in others gradually. Some of them are so gradual in onset as to be completely overlooked. Thus Hausman(6) found torsion (two and one-half turns) of a dermoid cyst in a case he operated for a diagnosis of tumor and amenorrhea, the patient giving no other symptoms; Davis(7) found an unexpected torsion in a case of Cesarean section; Ward(8) operated on a case of uterine bleeding of four weeks' standing and discovered an adherent twisted dermoid. Litzenfrey(4) performed a laparotomy for abdominal pains of four years' standing and the operation revealed a twisted (four times) adherent necrotic ovarian cyst.

In most of the cases, however, the symptoms come on acutely and many of them give histories of previous acute attacks. Even in patients seen during their first acute attack, we frequently find a history of more or less pain for a long time prior to the attack. In our own cases one gave a history of six acute attacks, one of four, and four of two, all of these patients feeling well between the attacks. Three of our cases gave a history of abdominal pain for some time preceding the torsion.

The acute symptoms of torsion usually resemble those of peritonitis. Severe pain is the most prominent symptom. It usually starts in the ovarian region of the side involved, but it sometimes begins as epigastric, pelvic or abdominal and then shifts to the seat of torsion. In one of the cases it started in the sacral region and in another in the left hip. Frequently the pain radiates from the primary seat to the other regions, most commonly to the inner side of thigh. In one case the primary ovarian pain radiated to the gall-bladder, in another to the vagina, in still another the pelvic pain was accompanied by severe paroxysmal pain in thigh and arm. The character of the pain is not alike in the different patients. In some cases the pain is continuous, with slight exacerbations, in others it is short, sharp and severe, reminding one of gall-stone and kidney-stone colic.

Next to pain the most general symptoms are gastrointestinal disturbances. They are found in almost all acute cases. About four-fifths of them give a history of vomiting at the beginning of attacks. In almost all severe cases a history of initial vomiting is obtained. In some cases vomiting recurs with each attack of pain, in others it does not. The attacks may begin with nausea to be followed possibly next day by vomiting. Three of our cases did not vomit at all in spite of the rise of temperature and of the very pronounced pathological changes in the tumor and peritoneum.

A still more general symptom is constipation. Sometimes it is so obstinate as to suggest a diagnosis of bowel obstruction. Secord(9) actually made an artificial anus to relieve a supposed case of obstruction, which three days later, in a subsequent operation, proved to be one of a gangrenous twisted cyst with extensive adhesions.

Abdominal distention is another common symptom. This may be due to the changed position of the cyst during torsion, bringing its more prominent part forward into the most roomy concave part of the abdomen, but in most of the cases it is caused by hemorrhage or transudation of serum into the cyst-cavity. Occasionally tympanites is responsible for the distention.

Abdominal tenderness is rather frequently met with in the acute cases, especially during the first few days. This symptom is found in cases which present advanced nutritional disturbances with ascites or peritoneal inflammation. In bad cases muscular rigidity accompanies the tenderness. Such cases usually show a moderate rise of temperature and pulse.

A high pulse and temperature are seldom met with in torsion cases.

Urinary symptoms of torsion are rather interesting. They consist of dysuria or difficult and frequent urination. It was reported in nine cases, two of our own and seven collected from the literature. In five urination was painful; in four it was found difficult and frequent. These urinary disturbances are ascribed by Pfannenstiel to the twist of the uterus. I believe it is possible however for the torsioned cyst itself to bring about pressure on the ureter and thus cause the annoying urinary symptoms. Berard, quoted by Pfannenstiel(4) reports a case in which ureteral dilatation and pyelonephritis were found as a result of a torsioned cyst with twist of the uterus and broad ligament.

Another symptom of interest found in torsion is uterine bleeding possibly caused by an acute passive congestion brought about by pressure on one of the ovarian veins. We found it reported in five cases. In a case of Dr. Ward(8) the uterine bleeding lasted a whole month and was the only symptom that operation was undertaken for. Among our own cases two nursing women began to bleed from the uterus with the onset of torsion.

Symptoms of collapse and fainting are occasionally met with. They are usually attributed to intracystic or peritoneal bleeding. We found five such cases. None of them had peritonitis or adhesions. The cystic fluid in all these cases was found to be bloody,

and in only one case reported by Strauss(10) was bloody serum found free in the peritoneal cavity. The three positive features found in all the collapse cases were the very severe pain, the rapid growth of the tumor and the presence of blood in the cystic fluid.

COMPLICATIONS.

These are the most common symptoms of torsion as we find them. Of course, these symptoms are greatly modified by those of the complications which are met with in torsion.

We called attention above to the toxemia as a sequela of the necrosis following torsion. While itself a very serious sequela, the toxemia sometimes brings about complications that are fatal, independently of it. Ohlshausen called attention to acute nephritis and Stoeker to acute yellow atrophy of liver as complicating the toxoemia of torsion (cases of Broese(11), Strauss(10) and Stoeker).

A complication of rather serious consequence is rupture of the torsioned cyst. The increased intracystic pressure would make one suppose that rupture is a common complication of torsion, but this is seemingly not the case. Neither in our own cases nor in the literature have we met many such complications. Nor is rupture of a twisted cyst always fatal. Its results depend a great deal on the size of the vessels torn and on the degree of toxicity of the cystic fluid. A cyst with a fluid of low toxicity ruptured through an area poorly supplied with blood-vessels may cause comparatively little additional disturbance (Strauss's case(10)).

There is another important and interesting complication occasionally met with in torsion, *i.e.*, the involvement of neighboring organs in the twists. Such a complication may occur when an organ, most commonly omentum or loop of bowel, becomes adherent to the ovarian tumor prior to the occurrence of torsion. When torsion of the cyst takes place, the adherent bowel or omentum may take part in the torsion with the pedicle (case of Dr. Payr(12)). This complication may also occur when the twisted tumor lying in the abdominal cavity is pulled down into the small pelvis as a result of its shortened twisted pedicle, carrying with it a loop of bowel. As the cyst rapidly enlarges in size its pressure on the bowel gradually increases thus inducing in it (bowel) necrotic changes (case of Dr. Derera (13)). Again, as a result of torsion, the pedicle may become short and tight and the organs with which it is brought in contact may become constricted to the point of interference with their circulation or function (compression of the ureter in the case of Beard(4)).

DIAGNOSIS.

Torsion of a cyst is a serious accident and frequently demands immediate attention. The early diagnosis of this condition is, therefore, very essential. The cases in which torsion comes on gradually frequently present so few symptoms referable to the ovarian cyst that it is completely overlooked. When a cyst is found in the pelvis, the development of new pelvic symptoms unaccountable by findings, should, in view of the frequency of torsion, bring up for consideration the possibility of a twisted cyst.

In an acute case in which the previous presence of the cyst is known, a diagnosis of torsion should be easy. We have to differentiate torsion from pelvic inflammation, inflammation of the cyst, gall-bladder or kidney colic, ruptured ectopic, appendicitis, appendicitis with pregnancy, perforation of bowels and perforation of stomach. If the pain and tenderness are localized over the tumor, the presence of which was known to the patient, especially when a history of rapid increase in its size is obtained, the diagnosis is simple. But when the presence of the cyst is unknown to the patient the diagnosis may not be so easy. An attempt must then be made to decide whether the abdominal mass is an ovarian tumor. A pregnant uterus with pathology to account for the acute symptoms may be mistaken for a torsioned cyst especially in a stout patient with a rigid abdomen. In such cases anesthesia may be necessary to aid in diagnosis.

Again, we must remember that a patient with an uncomplicated cyst may have symptoms suggestive of torsion, the symptoms being due to such diseases as cholelithiasis, appendicitis, etc. Such possibilities should be borne in mind and must be excluded in the usual way.

The diagnosis of torsion may be much easier after the acuteness of the attack has passed. With the tenderness relieved the mass can be better defined, the uterus and appendages more conveniently examined and the exact seat of pathology better located.

A history of frequent attacks of pain out of proportion to the low temperature and pulse is a valuable diagnostic point. Left-sided torsion, on account of the exclusion of appendicitis and gall-bladder, is easier to diagnose.

PROGNOSIS.

That torsion does not always lead to a fatal termination is shown by the many cases that give histories of previous severe attacks from which they obtained relief for a variable length of time. A

favorable outcome of torsion is expected in cases in which the circulation is reestablished by adhesions to surrounding organs, by the untwisting of the pedicle, and the formation of new capillaries. Cases that do not regain their circulation undergo necrosis and terminate fatally if not operated upon.

Complications, such as rupture of the cyst, the involvement in the twist of surrounding organs, acute nephritis and acute atrophy of the liver add a great deal to the danger of torsion.

The operative prognosis is generally good. Even the presence of peritonitis and ascites do not seem to affect the results unfavorably. There were no deaths in our cases and of the four deaths found by us in the literature, one was due to acute nephritis, one to yellow atrophy (both secondary to toxemia), one to perforation of sigmoid caught in the twist, and one to sepsis.

TREATMENT.

Recognizing the dangers of torsion we must adopt only one line of treatment and that is operative. Pregnancy is no contraindication to the operation. Our Case VIII and another case of ours of torsion of the right adnexa during the fourth month of pregnancy (to be reported elsewhere) went to full term and were delivered of living children.

While the abdominal route is simple and safe, the vaginal route may be preferable in cases in which the twisted cyst is easily accessible through the vagina. The good result obtained from the vaginal ovariotomy in our Case V shows that in favorable cases it can be safely and successfully used.

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DISCUSSION.

Dr. Channing W. Barrett, Chicago.—One of the chief points of interest is that ovarian cysts with twisted pedicle very frequently come on with pregnancy, some either occurring during the pregnancy or at the time of labor, or directly after the delivery. The question is how to deal with an ovarian cyst and yet save the ovum. In a series of cases collected the percentage of frequency of abortion following operation was almost in direct proportion to the trauma done beforehand. The further question that was brought out in this series was what to do with the ovarian double cyst, there being the rather common notion that if both ovaries are removed abortion will take place. Abortion did not occur in the series of double removal of the ovaries, but slightly than in case of removal of a single ovary, and that is easily accounted for by the extra manipulation of taking out two ovarian tumors rather than one.

Dr. Albert Goldspohn, Chicago.—We can, if we look carefully, inspect the outer part of the cyst wall near its pedicle, and frequently see macroscopic evidence of Graffian follicles, and I have repeatedly dissected out that outer layer carefully, ligated the vessels without compromising the main pedicle, and folded the flap up and stitched it, and menstruation has followed from that.

The main thing I want to say is that Dr. Menge now of Heidelberg, has gone a step further, and has done the same thing whether there is any macroscopic evidences of Graffian follicles in the structure or not, and menstruation has followed.

Dr. Hugo O. Pantzer, Indianapolis, Ill.—Enlarging upon what Dr. Goldspohn has said, that ovarian tissue in cases of ovarian cysts has been found quite distant from the hilus, a German author has recently published an article in the Centralblatt fuer Gynecologie. He refers in one instance to finding ovarian tissue high on the side of the cyst, quite remotely to the hilus, or where one would alone expect to find it.

Regarding the frequency of serious twisting of the pedicle of ova-

rian tumors, I have had a unique experience. I have had fourteen cases of torsion of ovarian cysts in fourteen consecutive months, and then none in more than two years.

Dr. Sanes (closing).—In our series we had no bilateral torsions. We think, however, that after operations for bilateral torsions of ovarian cysts complicated by pregnancy the possibility of abortion should be great. Operations for unilateral torsion cases do not seemingly interfere with pregnancy. Besides the reported case of torsion of an ovarian cyst complicated by pregnancy, we had one of torsion of right tube and ovary. The operation was performed during the fifth month of pregnancy. No abortion followed.

The point I want to emphasize is the value of vaginal ovariotomy in some torsion cases. In one of our cases the operation was undertaken for exploration of an immovable mass in the pelvis to left and behind the pregnant uterus. When the diagnosis was made, after separating the firm and extensive adhesions, the ovariotomy was performed through the vaginal incision. The normal delivery that followed four months later indicates the possibilities of the vaginal route in such cases.

The diagnosis of torsion of cysts is sometimes very difficult. In one of my cases the diagnosis rested between pregnancy with appendicitis and torsion of cysts. The woman did not menstruate for about fifteen months on account of the last pregnancy and the lactation. She also gave a previous history which pointed to appendiceal attacks. No history of tumor was given. On examination a right sided tumor was found. The diagnosis between pregnancy and appendicitis on one hand and torsion on the other was considered. A careful pelvic examination was made under anesthesia. The uterus and left ovary were mapped out and the diagnosis of torsion was made.

TWO CASES OF CANCER OF THE UTERUS APPARENTLY CURED BY POSTOPERATIVE INFECTION.

BY

JOHN W. POUCHER, M. D., F. A. C. S.,

Poughkeepsie, New York.

CASE I.—In June, 1906, I was consulted by Mrs. J., sixty-five years old. She had noticed a bloody vaginal discharge for a long time before she consulted her physician, Dr. Gerow, of New Paltz, N. Y., who at once sent her to a neighboring hospital where the surgeon, after an examination, discharged her as inoperable.

It was several weeks after her return home that she came to me very anxious to take the chances of an operation rather than to go on feeling that she was doomed to die by inches. Although she presented all the local signs of an advanced cancer of the uterus, a copious bloody purulent and very offensive discharge, a large cervical mass, and a rather large, soft, infiltrated uterus, her general physical condition was fairly good.

I finally agreed to undertake the operation, giving her family very little hope that it would do any good. The hysterectomy was a very difficult one, owing to the breaking down of the soft cervical mass and the infiltration of the surrounding parts. Indeed, there were several masses on either side that I was obliged to leave. The operation was followed by copious suppuration, both from the vaginal and abdominal drains, which kept up with only a moderate fever for the next ten days, when it began to grow less and her condition became normal. The wound healed rapidly, and on July 21, 1906, twenty-four days after the operation she went home apparently cured. Of course, I expected to hear that the trouble had recurred in a few weeks or months at most, but as time went on and I heard nothing from her, I took it for granted that she had probably died from a recurrence. But on December 17, 1912, more than six years after the operation, she came back to me for advice about a rather large hernia at the site of the abdominal incision. A careful examination of the abdomen and pelvis showed no return of cancer. Since this visit, about two years ago, I have heard nothing from her.

CASE II.—October 1, 1912, I was consulted by Miss M., aged forty-three. She gave a history extending back for more than two years of a vaginal discharge which at first had been merely a disturbed menstruation, then a continuous discharge which had finally become extremely offensive. She was extremely weak, emaciated and cachectic. Examination showed a large rather soft cervical mass and a large infiltrated uterus which could be easily palpated above the pubes. Her condition had been evident to her friends for a long time and they had urged her to consult a physician, but belonging to that extremely modest type of middle-aged spinster she had de-

clared she would rather die than submit to examination or treatment, and only consulted a physician when her condition had become unbearable.

Her condition was explained to her and her friends as practically hopeless, but having once started she was very anxious for an operation, and I finally consented to do what I could for her. Operation October, 9, 1912; abdominal hysterectomy. The uterus was found enlarged; the walls thickened and soft; the lower portion and cervix consisting of a large mass about the size of a man's fist, which broke down easily and which apparently had no boundaries as it implicated the posterior wall of the bladder; the whole upper part of the vagina and filled Douglas culdesac. This mass I could only remove piecemeal, and you may be sure I was not very proud of myself for having even attempted it. The prognosis was, of course, very bad. A profuse suppuration set in almost at once. The abdominal wound broke down. A large abscess formed in the inner side of the left thigh, which was opened the fifth day. In fact, there was a large amount of pus flowing from everywhere. The softened bladder wall sloughed and urine flowed both through the vaginal drain and through the abscess opening in the thigh. About the end of the second week the suppuration began to grow less; the wounds began to show signs of healthy granulation, and the patient began to show a decided improvement in every respect. In four weeks the wounds had all healed, the urinary fistula had closed, and the patient was able to sit up. November 25, 1912, six weeks after the operation, she went home apparently cured. She has been under close observation since and has remained in excellent health with no signs of a recurrence. She has maintained good health and spirits, and at the present time weighs more than she ever did.

In both these cases the laboratory report showed the disease to be adenocarcinoma and in neither of them could I claim to have removed anywhere near all the diseased tissues, consequently the cure must be attributed to some other cause, namely, the suppuration and the formation of a toxin that destroyed the cancer cells. There are, in the first place, areas of broken-down tissue filled with masses of dead cancer cells. The operation opens up fresh fields for their absorption. May we not have here a genuine autoinoculation of dead or modified cancer germs.

In going over the literature we find several instances of the spontaneous cures of cancer, and several pathologists with whom I have discussed this subject tell me that they have found post-mortem evidences of such cures. Is it, then, too much to predict that from this course there will be found a cure for this most dreaded of all diseases.

DISCUSSION.

Dr. Francis Reder, St. Louis, Missouri.—The essayist made one statement that I would object to, and that is, about modified cancer

cells or dead cancer cells. We know that we cannot consider modified or dead cancer cells in such cases as he has cited. The condition in these cases which terminated so happily must be summed up in this way: here we have a cancer condition which fortunately at an early period had been walled off through inflammatory products, thus blocking the lymphatic channels until the cancerous organs were removed by the surgeon.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—Dr. Poucher did not refer to the experiments made by Coley, of New York, in which he has had some happy results from the inoculation with the streptococcus serum in sarcomas, and to a certain extent in carcinoma. He did not report any cultures made from the pus discharges from the wounds of his two patients. If he had done so and found the streptococcus germ, which Coley is making cultures from, it might be one step toward helping the profession.

Dr. Miles F. Porter, Fort Wayne, Indiana.—I would like to ask the essayist upon what basis he made his diagnosis of cancer in these cases. Does the diagnosis depend solely upon clinical observation or microscopic examination, and what was the nature of the cancer. In the second place, I would like to ask whether or not observations were made as to the character of the infection we have in these cases. These are questions, it seems to me, of the utmost practical importance.

Dr. Charles W. Moots, Toledo, Ohio.—Six years ago I did a panhysterectomy and removed both ovaries and tubes in a woman who had adenocarcinoma of all these organs. The diagnosis was made by a pathologist of Ann Harbor and also by a pathologist of the Johns Hopkins Hospital. The woman is now perfectly well and is living in Detroit. She has gained 75 pounds since the operation.

Dr. Poucher (closing).—In answer to Dr. Porter, I would like to say the microscopic examination was made from specimens removed at the time of the operation. I stated that in my paper, and the disease was undoubtedly adenocarcinoma, and diagnosed by a very capable and skillful pathologist. I am very sorry to say, these cases occurred so far apart, that I had almost forgotten the essentials of the first when the second one occurred, and that was why no microscopic examination and no investigation was made as to the character of the discharges.

I have reported them as I thought they might be of some interest to the members of this Association.

FACTORS DETERMINING THE MORBIDITY OF SURGICAL CASES.

BY

C. W. MOOTS, M. D., F. A. C. S.,

Toledo, Ohio.

THE question of mortality has been pretty successfully and universally solved for the past decade, but many patients are not yet receiving the advantages of all the refinements which lessen the period of morbidity. Quite a large percentage of those needing surgical attention are of the laboring or producing class, and our aim should be to use every possible means to return them to normal health and to their usual occupation in the briefest possible period of time.

Standing preeminently at the head of influencing factors is the surgeon himself. So important is he, that we could very profitably spend all the time allotted us in discussing his character, training and special qualifications which are so necessary in order to bring to every case all that is due the patient. However, so much is being written upon this point, and so much will be done within the next few years, that we will dismiss it rather summarily with the observation that it is most fortunate for the public that the days will soon be only a memory when a physician with no pathological or technical training may go to one of our large clinics for ten days and return to his community a full-fledged operator, even though not a surgeon.

Next in importance is the making of a proper diagnosis of the conditions to be met. Every possible means should be brought into play to make a positive diagnosis, that the work may be well planned so as to insure its completion in the briefest possible time. This is especially true concerning work upon the gall-bladder and other organs in the upper abdominal region. I would not advocate haste, but rather that speed which comes with much thought and training and a certain gift. Unfortunately a few surgeons never acquire the manipulations which mean the best kind of work in the shortest possible time, and will therefore never obtain the highest ideals in morbidity, for surely with all other conditions equal, the convalescing period will be in ratio to the time occupied in doing the operation. This is due not more to the question of the amount of anesthesia than to the fact that a qualified, skillful operator who knows his anatomy and does not become disturbed by unexpected pathology, will pro-

duce the minimum traumatism to the tissues involved. A properly worked out diagnosis also particularly affects the subject under discussion in troubles in the right side of the abdomen. Many a case has been opened too hastily for indefinite symptoms on the right side, a fairly normal appendix and a small cystic ovary removed, but the patient does not get well. A more careful study of the history of the symptoms, aided by the *x*-ray and ureteral catheter would have shown the trouble in the kidney or ureter.

We come now to the almost equally important element, the preparation of the patient. By preparation I do not refer alone to the use of purgatives, skin disinfectants, and other technical means, but to everything that possibly can be done to shorten the morbidity period. The thing that stands out above all others in this rôle is the psychical attitude of the patient. This must depend to a great extent upon the personality, training and reputation of the surgeon. Many men fortunately are endowed by nature with the qualities that immediately beget confidence; others may obtain them by years of training. To be a successful surgeon, as viewed from the standpoint of morbidity, these qualities are absolutely essential.

After giving this phase of the subject study for years, I am convinced that a proper mental attitude of the patient is a most important factor, and to secure which implies that great care must be maintained in the selection and training of nurses, assistants, and anesthetist as well as of the surgeon. In fact, all adverse stimuli must be abolished. Thus a cheerful and hopeful cooperation of the patient will be secured, and she will approach the operating ordeal without injury to the brain cells and will offer the highest possible resistance to all pathological conditions, and surgical trauma. Looking forward to the postoperative training, we must certainly condemn in no uncertain terms the management of the hospitals that permit relatives and friends of the patient to frequent operating rooms and witness the operation. To begin with, it smacks of quackery, gives the relative, whose judgment on this question is worthless, a distorted view of the whole matter and opens the way for repeated and morbidly magnified descriptions of unimportant details, thus creating the worst kind of psychology in the patient, and prolonging the morbidity into months and even years. And this is only one of the many reasons against the practice.

The abandonment of a long course of preparatory treatment, especially the administration of purgatives which remove fluids from the body, has marked a big improvement in both morbidity and mortality. It is all well enough to treat some conditions before any

attempt is made to procure a cure by surgical means, but in the majority of cases, the shorter the period of time that elapses from the notification of the patient that a surgical procedure is necessary until it is done, the better. The mental attitude of the patient is so much better that this more than compensates for anything tending to argue against it. Of course, this does not imply any of the "rushing off" to the hospital methods, which are sometimes employed, but refers to the time following a careful study and diagnosis of the case.

After the surgeon has gone carefully into the history, made a correct diagnosis, and done everything possible to keep the patient in an optimistic and pleasant psychical mood, what are some of the things that can be done in the hospital, which will affect the subject under discussion?

First of all, all preparations of the patient should be as simple and undisturbing as possible. No haughty and commanding orders from nurses should be tolerated. Rather, the nurse is to be a companion. The field of operation is to be prepared in a thorough, but unpretentious, undisturbing manner. The patient is given water freely, which has a marked beneficial effect upon the blood pressure.

The selection of an anesthetic is now of paramount importance. First of all, shall it be local or general, or a combination of both, and always preceded by the hypodermic administration of narcotics?

After making a careful study of the use of local anesthesia in foreign clinics, I am convinced that we do not rely upon this form of anesthesia frequently enough. I am also convinced that it can never be used in America as in Europe, unless one has a class of patients that are rather below the average in their esthetic development.

The selection of a general anesthetic is an important factor. The use of ether by the present mode of administration has solved the question of mortality rate in all cases having fair resistance. There exists, however, a certain percentage of cases that cannot withstand both the operation and the anesthesia produced by ether. Therefore, many surgeons are content to use ether as a routine, but when an exceptionally bad risk appears, they demand an expert anesthetist and nitrous oxide-oxygen. It is well to note the manner in which these two agents produce anesthesia and then one understands why ether takes second place in a "border-line" case or very bad risk, even as to mortality. Ether produces anesthesia by dissolving the lipoids of the brain and other important structures. Besides affecting the red blood cells, it also puts to rest the phagocytes.

Nitrous oxide produces anesthesia by simply interfering with the use of oxygen by the brain cells.

This knowledge of how these two agents act should alone guide us in the selection of a general anesthetic, if we are willing to do all that is possible to lessen the morbidity as well as the mortality rate. The matter of having an expert anesthetist must be solved if we would bring to the patient all that she justly demands. I believe that the average surgical risk has a right to all the refinements known as well as the very bad risk. It is certainly unfair to any method of anesthesia to use it only in cases in which one is afraid to use ether, and then point to an occasional bad result.

For a long time nitrous oxide-oxygen was heralded as being indicated in short minor operations. To-day we select it above all others in operations requiring great length of time. True, we had, in our early experience, considerable difficulty with it because of the rigidity of the abdominal muscles, but as we learned to operate with a lighter hand and less traumatism, we had scarcely no difficulty in this respect; finally, when two years ago, we commenced to use Crile's principle of anoci-association all difficulty with muscular rigidity disappeared.

We have tried to study the subject without prejudice, and conclude that the question of morbidity is more nearly solved by the combined use of the preoperative hypodermic administration of a proper dose of a combination of some form of opium and scopolamin, to the point of securing the "twilight sleep," followed by the proper administration of nitrous oxide-oxygen, together with the application of Crile's anoci-association, than by any other method. It requires the combination of the three principles to secure the ideal. The determination of the size of the dose of each of the preliminary narcotics to be used, is very important, and, if possible, should be determined by the anesthetist after a careful examination of the patient and with full knowledge of the work to be done. The ideal will not be reached by having a standing order for the same dosage for all patients.

The position in which the patient is kept during the operation has quite an effect, both upon the mortality rate and the morbidity. I have always objected to the use of the extreme Trendelenburg position, although often making the surgeon's work easier, and am in warm sympathy with the recent articles of Dr. Gatch upon this subject. Together with Gann and Mann, he has shown by animal experimentation that the three principal factors in causing heart strain are, Trendelenburg position, pressure on the abdominal viscera, and struggling of the patient. In importance, these rank in the order named. "Experiments on dogs under anesthesia were striking.

Only four of fifteen dogs lived in the Trendelenburg position over one and one-quarter hours unless revived by artificial respiration, the same results always being noted, viz., slight increase in the blood pressure, slight increase in pulse rate and increasingly labored breathing, finally ceasing. When the breathing fails, the heart, poorly supplied with oxygen, has to pump a blood supply made greater by gravity against a blood pressure increased by asphyxia. Asphyxia injures the cardiac muscle and raises blood pressure, while the Trendelenburg position causes an increased amount of blood to be quickly returned to the heart."

The matter of sutures is of grave importance. Americans are pretty well united in the opinion that absorbable sutures mean a shortening of the convalescing period, provided there is no infection and no giving way of the sutures. The secret is to use material that is sterile, as well as the smallest size necessary to hold the strain put upon it, and that which will be absorbed immediately after its function has been completed.

Finally, the operation must be done without apparent haste, yet in the briefest time possible, all raw surfaces covered over if there has been interference with abdominal or pelvic organs, fluids started in the system at once, meddlesome hypodermics during and after operation discarded, and the proper mental suggestions made, so that the patient goes home without feeling she has undergone an "awful ordeal," instead of being taught that she had a narrow escape and only her particular surgeon could have saved her. In most cases, no belt or abdominal support should be worn. The abdominal muscles atrophy just as well as the arm muscles when bandaged. Besides, all unnecessary apparatus causes bad psychology. Excepting infected ones, the abdominal cases should be moved about, and be up in a chair much sooner than was formerly supposed.

347 Nicholas Building.

DISCUSSION.

Dr. George W. Crile, Cleveland, Ohio.—Dr. Moots has covered this broad and most important subject in so satisfactory and comprehensive a manner that there is little, if anything, to add to the list of factors he has enumerated as affecting postoperative morbidity.

I would perhaps emphasize even more that he has done the importance of *delicacy* in the operative technic. In our clinic we add to the technic described by Dr. Moots—or rather, I would say that our complete anociated technic includes, in abdominal operations especially, the injection of quinin and urea hydrochlorid at a distance from the wound. By this means postoperative pain and gas pains are minimized or in many instances wholly prevented. I would

emphasize the necessity of making this injection *at a distance* from the incision as thus delayed healing of the wound will be prevented, while the whole traumatized area will be affected by this local anesthetic whose effects last from twenty-four to forty-eight hours.

I would like also to emphasize the value of the use of morphia not only as a postoperative sedative but during and after the operation in those cases in which the patient's energies have been so exhausted that the further drain upon them by the operation might prove fatal. In cases of acute infection demanding emergency operations morphin is of especial value, for as we have proved morphin protects the brain not only against exhaustion caused by trauma, but against that caused by infectious processes as well.

Of greatest value is the point which Dr. Moots has emphasized indirectly throughout his paper, that the individual patient is the central point of each operation. His individual needs are to be considered at every step and his eccentricities of temperament as well as of physique respected so that before, during and after the operation there may be no rough points of contact.

THE PRESIDENT.—I would like to ask Dr. Hewitt, of Detroit, to take part in this discussion.

DR. H. W. HEWITT, DETROIT, MICHIGAN.—I consider it an honor to be asked to be a guest of this Association, and it is a greater honor to be asked to take part in this discussion. I have been very much interested in the paper of Doctor Moots, inasmuch as I have been working along the line of anoci-association for about two years, and during that time have done in the neighborhood of 300 laparotomies. At first, my results were not good, but this was due to faulty technic. I visited Crile's Clinic a second time, watched him more carefully, and found out where my mistakes lay. I returned home, took more time in doing the operations and was able to eliminate these mistakes, thus securing good results.

What Crile especially emphasizes in connection with these patients is team work. When a patient enters the hospital, he or she, as the case may be, should be tactfully handled by nurses and orderlies, interns and surgeons.

The night before operation we usually give the patient a large dose of some hypnotic. Lately we have been using veronal. This gives them a good night's sleep. Early in the morning, before the effect of the veronal has worn off, we give them one or more doses of morphin and scopolamin, or morphin and atrophin. When we use two doses of morphin and scopolamin or narcophen and scopolamin, it gives the patients the so-called twilight sleep. We have taken them to the operating room without their knowing where they were going. I have visited these patients after operation and had them ask me when I intended to do the operation.

With regard to the morbidity, if we use these preliminary drugs, if we use nitrous oxid and oxygen anesthesia given by an expert, if we are careful to inject every tissue by novocain (either one-half or one-quarter of 1 per cent. solution) before the tissues are cut, it will certainly protect the brain cells from exhaustion and prevent

shock. If there is one thing we can say in favor of anoci-association, it is that it prevents shock. This does not mean so much in the ordinary risks, but in the bad risks it means everything. We have saved a number of patients by the technic of anoci-association who otherwise would have been lost.

In listening to Dr. Reder's paper yesterday, with regard to tympanities, I was quite interested. When we use the technic of Crile, and especially when we use quinin and urea hydrochlorid, injected a distance from the wound, we find that there is very little tympanites. In over 90 per cent. of the cases there is no tympanites. We strap the abdomen tightly with adhesive plaster, and it is seldom we have to loosen the adhesive plaster until necessary for the removal of the sutures. These patients have very little postoperative pain. I have been able to remove some appendices in patients who have had no postoperative pain whatever. I think we will be able in time, when our technic is more nearly perfected, to steal the appendix, as Crile steals the thyroid. If we can steal the appendix we can steal the gall-bladder without the patient's knowledge.

It would seem that with the absence of shock, with the freedom from postoperative pain, and with the rapid convalescence, that the morbidity following operations should be greatly reduced.

Dr. Matthew D. Mann, Buffalo (by invitation).—I thank you very much for the privilege of speaking before this honorable body. I am very glad you have chosen Buffalo for your meeting-place, and sincerely trust that you will enjoy your stay while here.

The paper to which we have listened touches a great many fundamental points, and it will be impossible for me to discuss all. I am very glad Dr. Moots has taken up the matter of pain in the right side. This is often due to trouble in the ureter and sometimes we find it in the left side due to the same cause. I do not know how many times I have seen cases just about to be operated on or which had been operated on for the removal of the ovary or the appendix, where the patient was no better after operation, because the trouble was in the ureter. We have overlooked troubles in the ureter and bladder too frequently. The ureter can sometimes be palpated; sometimes it is so thick from inflammation that you can feel it distinctly. In many cases it is so tender that if you press on the right spot you will elicit pain and then you will know what the pain is due to. The ureter is just in front of, and to one side of the uterus in the anterior vaginal wall. You can locate it there very readily, and it is usually just at the mouth of the ureter, where the tender spot is. Often you can elicit pain by pressing the bladder between the finger and symphysis, pressing it upward against the bone, a sure proof of trouble in the trigone and base of the bladder. If that be the case, then a more careful examination of the bladder will show nature of the trouble.

Now in regard to catgut. In Buffalo we have used iodin catgut, prepared after a method originated in my clinic, by my son Dr. E. C. Mann. The catgut is put in a solution of iodin in ether, not the tincture of iodin in ether, but iodin scales, and it works exceed-

ingly well. We use a 10 per cent. solution, although it is not necessary to be exact. This solution when made can be used for years. It gradually loses its strength, and then more iodin or ether may be added. It never becomes infected. No germs can live in any such solution. The catgut is dropped into this bottle just as it comes from the manufacturer and left in, according to the size of the catgut, from one to five days. Then pick it out, dry it or keep it in absolute alcohol, which ever you like. I have used such catgut for ten years, as have Dr. King and others, with great satisfaction. We have had no stitch-hole abscesses from it. It lasts a little longer than ordinary catgut; that is, it does not absorb quite so quickly. I do not think I have ever seen a single case of irritation or infection which I thought was due to the catgut, after having used thousands of pieces of it. I think it is decidedly the safest, easiest, cheapest and nicest way to prepare catgut I have ever found. There is enough iodin to kill any infection you may get onto it while operating and to resterilize it even after it has been handled. We do not make a practice, however, of handling our catgut and using it afterward.

I thank you very much for the opportunity of speaking.

Dr. Charles L. Bonifield, Cincinnati.—Dr. Moots certainly read an interesting paper which, I am sure, we have all enjoyed, and he has taken up so many subjects and covered such a broad field, that within the five minutes allotted me I can only touch on one or two phases of it.

In my opening remarks I recall what an old teacher of mine very frequently said, "The world goes round and round, but it still keeps moving on." Dr. Mann will remember well, and many of us will remember less distinctly, the days when every laparotomy nearly was preceded by the injection of morphin, and patients were made absolutely comfortable with morphin until recovery took place or death carried them off. And then came Lawson Tait on the field, and if there are two things that Lawson Tait taught us, it seems to me they were that we must get through an operation as quickly as possible, without unnecessary traumatism, and that we must be more sparing in our use of morphin. I never had the pleasure of seeing that great operator work, but from what I learned from those who told me, he was not exceedingly aseptic, but he possessed great manual dexterity. He was able to do in a short time just that which was necessary to do and no more. He reduced the mortality of abdominal operations tremendously and taught the world pelvic and abdominal surgery.

Next to that in my mind was his teaching not to kill patients with morphin. I do not doubt, and I am willing to admit that the pendulum may have swung too far; that we have gotten too radical against morphin; that when our patients are suffering too much, there are times and places where morphin should be used, but that fundamentally morphin is bad for these cases cannot be denied. In the first place, after every abdominal operation that has ever been done, there is a certain amount of infection. To get rid of that infection we depend upon the vital powers of the patient and especially on

elimination. If our patient cannot eliminate; if her kidneys are not working well; if her bowels will not move after a reasonable length of time, she is overwhelmed by the poison and dies in spite of anything. Now, if there is anything we know about morphin, it is that it constipates the bowels, it stops peristalsis. Every doctor who graduates thinks he must stick a hypodermic in his pocket and go around shooting everybody who has a little colic, and so on. As the years roll around he uses it less and less frequently. Every textbook I have ever read on diseases of the kidneys tells us that morphin is an exceedingly dangerous drug to use in those whose kidneys are diseased. It interferes more or less with elimination, and in this way it dries up the secretions, so that morphin used in this way indiscriminately should be condemned.

The next point I want to make is that all of these things are very nice as we hear about them, but it is remarkable how well patients do without them. We were not killing them all before these things came around, and they were not all suffering the torments of the damned by a good deal. It is true, they had some pain.

Dr. Reder read a paper this morning. It was an excellent paper. There were a lot of good things in it, but he knows and I know and everyone of you know the minute the bowels move freely, and gas is passing freely, the patient is relieved. You will not have any more trouble with your patient. If you want to prevent the bowels from doing that, fill them up with morphin, and they will not pass any gas; you can relieve pain and distention with the morphin, but that is not relieving the condition that causes the pain.

Formerly, I was engaged in general practice for ten years, and if there is any one thing I learned in that ten years of the general practice of medicine, it was to simplify my prescriptions. I found that one good active drug was all I could use and watch at any time.

I found if I was giving one good active drug whose physiologic action and therapeutic effect I fully understood, I did not want to give any more to muddle it up. So if in the next six months I should call on any of my good friends to operate on me for gall-bladder trouble or for appendicitis, I pray you not to fill me up with other drugs, but give me ether in the old-fashioned way. (Applause.)

Dr. J. Henry Carstens, Detroit.—Several years ago I read a paper on a similar subject to that which the doctor has dealt with to-day. I want to commend him for bringing this subject before the Association. In my paper I emphasized the importance of cultivating the fine Italian hand. I do not like so much fuss and feathers. I have always made a plea for simplicity. When a patient comes to the hospital for operation, she is put to bed, and a nurse looks after her. If she needs an anodyne during the night to relieve pain, she receives it. If she does not need it, she does not get it. The nurse prepares the patient. She washes her, combs her hair, and keeps her mind occupied so that she is not thinking about the operation. I do not have my patients shaved when they are conscious. The minute you shave them, their attention is directed at once to the operation and about the incision, things she did not think of before.

It is a good thing to shave them, but it takes but a few minutes to do this after the patient is on the table. It is a great deal better to do it then. You can give the patient a good dose of morphin, and morphin has a wonderfully stimulating effect. Instead of cowards, it makes heroes of these patients. They have courage. In the old days they gave them large doses of whiskey to keep up their courage, but now a good dose of morphin, say one-eighth of a grain with atropin will do that. The patient is rolled into the operating room, and if my house physicians and nurses have not got everything ready, I want to know the reason why. When things are not ready it is liable to irritate one. As soon as the patient enters the room the ether cone is put over her mouth, so that it does not give her much time to think or to say anything. It is better sometimes to give the anesthetic in bed, but you cannot always do this in a hospital, and so the patient has to be rolled into the operating room and put under the influence of nitrous oxid gas first, and then after she is well under the influence of the gas we change to ether. After she is well under the ether the parts can be scrubbed again and shaved, and everything is ready. I thread my needles myself; I have the catgut ready, and I want to say that I use plain sterilized catgut, and not chromicized, not formaldehyd, nor kumol catgut, but plain catgut. My instruments are there and ready to be used. The instruments I use are very few, and no one handles them but myself, and I know what I am going to do. I have studied the case thoroughly and carefully and considered what complications I may meet, I do my work quickly, and I sew up the fascia with this plain sterilized catgut. These operations can be done rapidly. I do not let my assistant do anything in connection with the operation. He stands on the other side and looks on in silent admiration. I sew up the fascia carefully. If it is a clean case, I do not drain. I bring the skin together and use narrow strips of plaster, then I put a couple of large plasters around and that is all. The patient has not had much shock. I think the plan of anoci-association is unlimited. The patient is put on a stretcher after the operation; then I have my assistant give her 2 quarts of saline solution per rectum. The rectum may not hold it all, but if you give them enough so that it goes up to the transverse or ascending colon, they may lose a pint or two, but will always keep a quart. When this is done they do not need a drink for twenty-four hours. They do not want it. If you do not do that they are thirsty, then they require water to quench their thirst. Their blood-vessels are empty. They need liquid, and you give them this water. What is the result? With the water they will perspire, the blood-vessels will fill up, it will flush out the kidneys and eliminate a great quantity of effete material which, inside of twenty-four hours would cause trouble as a general rule. The patient begins to wake up and gets restless. Give her one-eighth of a grain of morphin and she will sleep for two or three hours. In the evening give her one-quarter of a grain of morphin with about one-one-hundred-twentieth of atropin, then when she wakes up she is not thirsty, she feels all right, and gets along without any trouble. What makes me disgusted is to have

a patient in the ward who belongs to some other practitioner, and who is allowed to cry and whine all night because they will not give her one-fourth or one-eighth of a grain of morphin, which would be sufficient to keep her quiet.

Dr. Bonifield spoke about Lawson Tait and his work. He was a crank on these little things. But what is the use of being such a crank. If patients require a small dose of morphin, give it to them. Do not give them enough to paralyze the bowels, but sufficient to keep them quiet and comfortable and let them eliminate. If you do that you will seldom have a case of gas pains or vomiting or any of these other troubles. These patients get along very well under such treatment, and in about ten days or two weeks you can take the plaster off. You will see the line where the skin has come together, and that is all you see. If I have a pus case, I will put in a few silkworm-gut stitches extra for fear the patient will dispose of the catgut too rapidly, but if there is no pus I do not do that. I do not give them any more morphin after that. If I have trouble with house physicians, it is that they want to stuff my patients with some remedy. I give them nothing except all the drink they want, fill up the blood-vessels, flush the kidneys and eliminate effete material. I may give them a glycerin enema, and if this is done in forty-eight hours there will be little or no trouble, or very little immobility on part of the intestines.

Dr. Erdmann.—I would like to ask Dr. Carstens how he prepares his catgut.

Dr. Carstens.—The catgut I use is put up in packages and is already sterilized. My catgut is not chemicalized; it is plain sterilized catgut without the use of any chemical. Some of the patients I have operated on, where I have used chromicized catgut or other kind of catgut, have gone home and in about three months thereafter have had a cold abscess or something like that. The catgut would not absorb, and this scared them very much. I use catgut that I know will be absorbed before the patient leaves the hospital, and then she will have no such trouble. That is the reason I do not use chromicized catgut, not even in hernia operations.

Dr. Emery Marvel, Atlantic City, New Jersey.—It seems to me, the question of morbidity is one of the most important we can consider next to mortality. If I interpret Dr. Moot's paper correctly it deals with the immediate morbidity. In connection with which there are three factors which come up for consideration in this discussion. I think it is right for us to assume that quite a degree of perfection has been attained in the diagnosis of disease before surgical treatment is applied. Assuming that is true, how can we make the impairment of health of shorter duration, and the return to absolute health more nearly complete?

In speaking of the immediate morbidity Dr. Moots referred to the preparation of the patient. I have been recently impressed with the inconsistency of the teachings in regard to the preparation for a surgical operation, particularly that teaching which directs complete elimination of the gastrointestinal contents. I mean

now the starvation for a day, or days, before operating. This places the patient in the very position in which we do not desire that patient to be in—exhaustion. It is time for us to discontinue starvation and have the patient take nourishment up to a few hours before the operation. The stomach in a normal condition will empty itself in from six to eight hours. A patient taking a meal twelve hours before operation will have the stomach empty by the time the operation is done, and there need be no fear in the majority of cases of the food not being properly assimilated.

The time of waiting before an operation is undesirable. The psychic influence of waiting, anticipating operation, I cannot consider as being good. The question of building up these patients before operation, as suggested by our medical confreres of preparing them for the ordeal of operation, is not well taken. The condition of the mind with an operation continually being considered is not favorable for betterment. If a patient did not have a disease which requires an operation, an operation would not be done. Therefore, the cause for the operation ought to be removed promptly. The morbidity brings us to the suggestions on the part of the physician. One case comes to my mind of a patient who was confined to her room as an invalid for four years. She was implored by her physician to keep quiet after the operation and this suggestion upon the part of her physician remained with her though no justification was evident. This illustrates very emphatically the condition that prevails, and I think great emphasis should be given to the surgical convalescent patients that they can do. There are too many *donts* and not sufficient *dos* to prevent the remote morbidity, Dr. Moot has not said much about the remote morbidity, and there, it seems to me, we owe a responsibility to society and to the state. One statistician has computed, that each life is worth to the state $2500, and every time life is held in a condition that he cannot give the state its earning capacity it behooves our effort to shorten the invalidism. I wish to express my pleasure to Dr. Moots for bringing this subject before the Association and having treated it in so excellent a manner.

Dr. Moots (closing).—I am in hearty accord with nearly everything that has been said in the discussion on my paper, and I wish to thank the fellows for their free expression of opinion.

Dr. Marvel's remark about the physician's statement to the patient impresses us forcibly, and I trust I will be pardoned if I speak of that just for a moment. How many times do we as surgeons find a patient to whom the doctor has said before we see the patient, that after this or that operation you must be careful a year or two years; you must not run a sewing machine for a few months; you must not go upstairs for three months and all that tommyrot. If we handle these cases right, the ordinary abdominal case should be able to go home in two weeks, and a housewife should be at her usual vocation in three or four weeks. Why? Because she will get her mind off herself.

As to the remote morbidity of which Dr. Marvel speaks, I think

we will never accomplish what we should in that regard until hospitals have a better system of keeping track of patients. In other words, we must study the product of the hospital with all that that implies. The social service must be considered and everything of that kind. We can never shorten this period of morbidity, especially remote, whatever we may do as regards technic, until those of us who are compelled to work in semi-public hospitals can get the managers of these hospitals to stop the visiting by laymen in the operating room. You cannot do it because a brother, a cousin, or a friend of the woman goes home to the little town in which she lives and describes in detail everything that you do and everything that you do not do, and by the time the patient gets home the people have been told that the surgeon took her bowels out, laid them out on the table, put them back again, and on Sunday morning John tells her about it. Next week Mary tells her, and this goes on for months and months. We must stop that sort of thing if we would get the right kind of morbidity.

MINERAL SPRINGS OF SARATOGA.

BY
DOUGLAS C. MORIARTA, M. D., F. A. C. S.,
Saratoga Springs, N. Y.

I FULLY realize that a paper on the mineral springs of Saratoga can, at best, have but a remote bearing on our usual subject matter. However, in view of the prominence into which our springs have recently come because of their purchase by the State, I trust that a brief resumè of their history, constituents and clinical action may prove of interest.

At Saratoga, there is an area of about 3 square miles which, because of the number and variety of the mineral springs contained in it, is unique in the history of the world. Mineral springs, as we know, occur throughout the United States and the continent of Europe, but in widely separated localities; while in the area mentioned at Saratoga are found sulphur, iron. alkaline and saline waters within a few hundred feet of each other.

The origin of these springs has been discussed by eminent chemists and geologists at much length, since their first discovery, and their theories have differed widely. On one point they are agreed, and that is, that volcanic action, occurring ages ago, was the cause of the fault or break in the earth's crust, which is some 36 miles long, runs generally north and south, and extends through the area in which the springs of Saratoga are found.

A review of the theories concerning the origin of these springs is not within the limits of the time at my disposal. There are, however, several very interesting problems necessarily connected with any theory as to the origin of these waters:

A. The source of the carbonic acid gas;

B. The source of the bicarbonates of the alkaline earths, magnesia and iron;

C. Why all the drilled springs should be found in the limestone near the surface of the earth; and

D. Why all the drilled springs are found east of the fault.

Some eminent theorists seek to account for the carbonic acid gas, which is present in large quantities in these waters, by referring its origin also to volcanic action. If their theories are correct, then

this gas has been stored up in some mysterious way for ages, in enormous quantities, and is capable of being liberated continuously, at a uniformly low pressure, as it occurs in our springs.

While I do not flatter myself that I can make clear what so many, wiser than I, have only succeeded in making cloudy, yet I submit a few points for you to think about; for, as has been said, "a theory, to be of any account, must tally with the amplitude of the whole earth." To me it would seem that the gas found in our springs must be evolved from carbonates by heat, the same reaction occurring as in an ordinary lime kiln, where the carbonate is reduced to an oxide, and the carbonic acid gas is liberated. It seems rational to conclude that the process by which this gas is evolved is constantly going on; and theoretically it must be in the interior of the earth, at a great distance from the surface, if heat is the cause of the reaction.

All the drilled springs at Saratoga are found in a strata of limestone, which in this locality is at the earth's surface, being covered only by shale, slate, and earth of from 100 to 500 feet in thickness.

If we try to theorize on the origin of the bicarbonates of the alkaline earths, magnesium and iron, we must first mix the carbonic acid gas with the waters of subterranean streams, somewhere within the earth, and have it reach the strata of limestone, where are found the carbonates of these substances. For when water contains an excess of carbonic acid gas, it can act as an acid; and when it flows over, or percolates through rocks containing the alkaline earths, it can convert the carbonates into bicarbonates of the corresponding bases.

It is curious to note the fact that in penetrating the limestone with a drill, veins of water of varying mineral strength will be met at different depths; and in some instances the desired water from a particular vein has been used and the other veins excluded. The varying quantities of mineral constituents, found in the different springs, may be explained upon the theory that different strata of limestone contain varying amounts of these chemicals. In some instances, it would appear that the different strata are hermetically separated from each other, as the waters from springs situated near each other vary materially in composition and character; and frequently springs are not influenced at all by the pumping of adjacent ones.

The first spring found at Saratoga was the one known as the High Rock. The water originally found its way to the surface of the earth unaided. As it flowed, the carbonic acid gas escaped, and the carbonates of the alkaline earths, and of the iron, were precipi-

tated. This resulted in the accumulation at the surface of a mass of chemicals, which was spoken of as the "rock," and from this the spring took its name. Later, an excavation was made down to the bed rock from which the water was seen to flow, an inverted hopper was placed over this point, made tight with clay, and from the top of this hopper a tube was brought to the surface through which the water flowed. Later springs were similarly discovered and treated.

In 1870 the first spring was developed by drilling. When the water was confined in the drill hole to a small nozzle, it would spout from 20 to 30 feet; and so this spring became famous as the "Geyser" or spouting spring. Since that time all the springs at Saratoga have been developed in this way.

About the year 1885, a report was circulated that the springs at Saratoga were lost, a report as unfortunate as it was fallacious. This came about from the fact that business enterprise had begun collecting the gas from these waters for commercial purposes. At first this was done in a limited way; but, later, deep gang pumps were placed, which pumped 1000 gallons a minute, night and day, from which the gas was collected, while the water was wasted; in the early days, the total overflow from all the springs did not exceed 10 gallons per minute. Continuous pumping of this enormous quantity of water resulted in lowering the water level, and consequently the springs did not flow at the surface, though the gas and chemical constituents remained in the same proportion.

It finally became apparent that pumping must be stopped if our springs were ever to flow again. Accordingly the town's people were aroused, went to the Legislature for relief, and an anti-pumping bill was passed, prohibiting the pumping of the water for the collection of the gas. At about the same time the State appropriated a million dollars for the purchase and preservation of these springs.

The waters from all the springs have been recently analyzed by the State, and their analysis shows the value of the springs, and also the fact that the different springs vary in total solid content from 115 grains to the gallon in the very weak waters, to 1216.1 grains in the strong ones.

The mineral waters of Saratoga are of two types, the sulphur and the chloride. The sulphur are characterized by the quantity of sulphuretted hydrogen which they contain; the chloride types is essentially free from sulphuretted hydrogen, and is saturated with carbonic acid gas.

This second type may be subdivided into three classes, viz., the alkaline, the alkaline-saline and the chalybeate.

The elementary substances found in our waters are chlorine, sodium, magnesium, iron, potassium, iodine, bromine, barium and lithia. The chemists show them to exist in the following combinations.

ANALYSIS OF THE WHITE SULPHUR SPRING, TAKEN BY STATE DEPARTMENT OF HEALTH, AUG. 25, 1913.

Chemical combinations	Milligrams per liter
Potassium chloride	4.47
Potassium sulphate	4.85
Sodium sulphate	25.08
Sodium bicarbonate	28.38
Calcium bicarbonate	208.21
Magnesium bicarbonate	83.10
Calcium silicate	28.25
Ferrous bicarbonate	1.59
Aluminum	0.99
Hydrogen sulphide	1.90
Nitrogen as free ammonia	0.094
Nitrogen as albuminoid ammonia	0.010
Nitrogen as nitrites	a trace
Nitrogen as nitrates	a trace
Oxygen consumed	0.80

ANALYSIS OF HATHORN NUMBER TWO.

Sodium chloride	10,652.45
Potassium chloride	958.50
Lithium chloride	76.53
Potassium bromide	69.20
Sodium sulphate	5.48
Sodium bicarbonate	697.75
Borium bicarbonate	56.66
Strontium, bicarbonate	2.28
Magnesium bicarbonate	2,844.70
Calcium bicarbonate	3,991.18
Ferrous bicarbonate	21.37
Alumina	24.41
Silica	17.60

Carbonic acid gas, range from one to three volumes, temperature 50° F.

It will be noticed from the analyses of our springs that they all contain about the same chemicals, and vary chiefly in the total quantity per gallon. A recently discovered quality of these waters is their radioactivity, announced by the National School of Mines, which is said to be due to dissolved salts of radium. While perhaps our enthusiasm on the subject of radium is out of proportion

to what is actually known about its therapeutic action; yet we naturally believe that its presence in our waters is a valuable asset; and it may account for the unusual action they possess, and also for the fact that no one has ever been able to duplicate our natural mineral waters synthetically, either in taste or action.

The study of the physiological action of a mineral water presents many complications. The physiological chemist, when studying a compound substance, bases his conclusions on the action of the predominating chemical. There are, however, in our waters a number of chemicals present in small quantities, each having a positive action when taken alone, which might readily be a factor in clinical results. So I believe it is impracticable to attempt to base the value of our mineral waters on the physiological action of any one ingredient; which is the principal, and which the synergist, in such a complex combination of chemicals, can at best be only an inference. Naturally, the same features influence the action of mineral waters as other drugs, that is, the individual peculiarities and the immediate functional condition of the patient.

Clinically, these waters possess qualities, and produce results, not common to alkalies or salines when employed singly. When used either internally or externally, they exhibit two distinct qualities, which I shall characterize as the immediate and remote action. When taken internally, the immediate results are to clean out the intestinal tract in a thorough manner, and at the same time increase peristalsis, removing pent-up secretions, and other effete matter which might have a toxic effect. They stimulate the natural secretion of the mucous glands of the intestines and gall-bladder tract, and also the functional activity of the liver and kidneys. Their action is aperient, cathartic, purgative, diuretic and antiacid, depending upon the quantity and type of the water and the time at which it is taken. As an aperient, the water from one of our strongest springs is usually necessary and should be taken before breakfast, the quantity being regulated by the individual peculiarity and the result desired. As a diuretic, the water from the same spring may be taken in small quantities, once in three hours, throughout the day. The milder waters, taken in larger doses, and at the same interval, are useful when alkalies are indicated, and will also act as diuretics; for this purpose they are preferable to the stronger waters, both on account of the greater quantity of water imbibed, and because of their more general palatibility. These mild waters, taken before meals, will act as excitants of acid secretion; while following meals, they are a mild antiacid.

The remote action is the correcting of a perverted metabolism, of anemia, and many ill-defined morbid conditions, of a more or less chronic nature, caused by imperfect metabolism.

For external use, the waters at Saratoga have a most enviable place in balneology. I can state with assurance that they have served me well many times, either directly, or as a synergist to the water taken internally, when associated with a regulated régime. The results obtained from the baths depend upon the specific gravity of the water, the temperature, the period of immersion, the amount of free carbonic acid gas, whether a rub is given in the tub, or whether the bath is followed by a massage and proper rest.

The immediate effect of the mineral water baths, when charged with an excess of gas, is to lower the pulse rate, while the force of the heart beat is increased. The surface of the body takes on a glow, in some instances approaching an exanthematous appearance, and the body will be covered with bubbles of carbonic acid gas. The dilatation of the peripheral vessels thus induced relieves the congestion of the internal organs, and ultimately effects trophic changes and general metabolic processes, which are of course factors in remote betterment. Moderate exercise after a cold bath is desirable, while a period of rest in the open is best after a warm bath. These baths produce universally a temporary sense of stimulation, followed by a period of lassitude, making the rest after the bath most enjoyable.

Our mineral water baths are of service in cardiovascular diseases, functional nervous conditions, with their concomitant manifestations, and obesity. Cold baths are contraindicated in almost every form of organic disease of the blood-vessels and heart. In exceptional cases they may be prescribed with caution. Saratoga baths can be taken colder than the ordinary bath, because of the stimulating of the peripherals by the carbonic acid gas.

So much for a very cursory review of the action of these waters; a very unscientific one, I concede; but even so; it is about all one can say, for the benefits derived are in large measure due to their association with a regulated régime. I attribute about 25 per cent. of the general betterment of the patient to the spring waters, and the other 75 per cent. to the régime followed.

We have heard so much about the wonderful cures at the European spas that a word in relation to them may not be amiss. When a comparison is made between the waters of Saratoga and those of Europe of a similar type, ours at Saratoga are remarkable in the quantity of free carbonic acid gas which they contain. In specific

gravity, all are about the same. The temperature of the Saratoga water is 50° F., while those at Nauheim are 80° F. They must often cool theirs, while we must heat ours; either is done without modifying the gas or the chemical content of the water.

In what class of cases is the use of the Saratoga mineral waters indicated? The overworked, fagged-out business man of the day, with a train of functional derangements due to an exhausted nervous system (such as isomnia, loss of appetite, restlessness and general irritability); in conditions of constipation, catarrh of the bile ducts, congestion of the liver, gout, rheumatism, primary anemia, diabetes, obesity, and cardiovascular diseases, particularly arterial tension. Indeed, all subacute or chronic cases will be benefited temporarily, when a regulated life is followed, though they may have to return for treatment from time to time.

Constipation.—Our stronger waters are most satisfactory in cleaning out the intestinal tract, acting as an aperient or drastic cathartic as desired, depending entirely upon the quantity taken. I have found them very useful in those cases of habitual constipation in which vegetable cathartics have been regularly taken; the effect in these cases is not only immediate; producing a painless and satisfactory evacuation, but many are permanently benefited.

Functional nervous diseases are universally improved by the drinking of the water, cold baths, and mechanical exercises.

Urinary Tract.—Irritation, due to hyperacidity, is relieved by the alkaline waters; at the same time, the kidneys are washed out, possibly carrying along toxins that may be in the blood from an imperfect oxidation of food; naturally these are less irritating when the urine is diluted. Where there is a pathological condition of the kidney, the same care is necessary in the selecting of a mineral water, as in using other drugs. The quantity of urine secreted by the kidneys should always be known definitely before the mineral waters are prescribed. When the quantity is less than 16 ounces in twenty-four hours, the patient should be put to bed, and water withheld until renal activity is being reestablished, when the alkaline mineral waters will be found helpful.

Cardiovascular diseases, I find, are relieved, many times to an unexpected degree, and for this I have no explanation. Not only the heart muscle, but the character of the heart beat, it would seem, is brought nearer normal. The carbonated baths, rest, and the Schott exercises have been so long exploited, and the results reported so unusual, that it is natural enough that those who have not personally observed them should be skeptical. I assure you that

they do have a most decided action on the whole circulatory system, when it is not in a state of degeneration; this may perhaps be due to the dilatation of the peripheral vessels relieving a dilated or, thickened heart muscle, and then restoring its tone. In arterial pressure, free catharsis from the use of one of our strong mineral waters in the morning, with the alkaline water after meals, proper exercise and a diet low in caloric units, will accomplish wonders. It is often a question, when a patient is taking a mineral water cure for this condition, to what extent we should withhold such drugs as the nitrites, digitalis, strophanthus and strychnia. I believe we should use them when indicated, and not trust too much to nature.

Diabetes.—The alkaline waters, which may be drank very freely in these cases, are valuable, not only because of the alkalies, but because it is said, they increase the oxidation and the carrying qualities of the blood. We know they should neutralize the fatty acids in the blood, which are so disastrous in this disease when they are allowed to accumulate. These patients are inclined to constipation, and one of our stronger saline cathartics invariably proves efficient, producing one or more watery evacuations. In fact, I believe a diabetic does as well at Saratoga, with our waters and a properly regulated diet, as it is possible to do anywhere.

Obesity.—This condition is most satisfactorily treated at Saratoga; the use of one of the strong cathartic waters taken before breakfast, a hot mineral water bath or the employment of Prof. Baruch's electrically heated cabinet with the head in the open air, exercise, and a diet restricted to 2000 calories daily, will secure results that are most gratifying, without the exhaustion so common to these cases under other treatment.

When a physician sends his patient to a place like Saratoga for a "Cure," he should either direct him, definitely and specifically, or else send him to a local man for advice and observation. For the convenience of those men who may prefer to direct their patients, I shall venture a few suggestions.

The mineral waters of Saratoga are in no sense a specific, though they do possess unusual therapeutic qualities peculiar to themselves. I might add that the prevalent idea that each spring has a particular quality peculiar to itself, that is, that one is good for rheumatism, another for gout, another for dyspepsia, etc., is erroneous.

I cannot too forcefully suggest that the home physician emphasize the necessity of the patient's following the prescribed régime absolutely; and that any modification or omission of detail cannot be countenanced. Saratoga is not under municipal control, as is the

case with the European Spas; neither are all the visitors in our village there for the purpose of taking a "Cure." Consequently our patients are very apt to act on their own initiative, or on the advice of some chance acquaintance. It is not uncommon to find a patient drinking indiscriminately an indefinite quantity of our waters, often with disastrous results. It is, moreover, essential that the waters should be taken at the proper time, if the best therapeutic results are to be achieved. Often a visitor believes that if he takes a pint of some strong mineral water in his room before breakfast, the drinking of which is followed by a free catharsis, he is progressing rationally and requires no professional attention.

It is unfortunate that we have at present no diet kitchen at Saratoga. The hotels are on the American plan, and it is therefore manifestly difficult to regulate the diet of a patient as we should.

An eminent physician has put our difficulties in this direction concisely when he says "it is not natural for a man to pay for birds and eat mush." However, when a patient has reached such a state of health that he is willing to go away from his home for treatment, he will, if properly advised, follow a prescribed course, and is usually ready to submit to personal inconvenience of habit.

I would call your attention to the following points:

A. Our climate is dry and bracing, and the air free from contamination of all kinds; our elevation is 360 feet.

B. All directions to the patient, as to hours of arising, retiring, bathing, taking exercise, rest, etc.—as well as the prescribed diet—should be carefully written down. Rich, highly seasoned foods, of a high caloric value, should be interdicted, quite as much as alcoholic beverages.

C. The patient must expect to stay not less than six weeks, if the greatest benefit is expected. This length of time will make it possible to follow the active treatment by a less strenuous after-treatment, though the régime should be no less methodical.

D. The waters should be taken *only* as directed. The strong waters sometimes produce hematuria in pathogenic conditions of the kidneys: and when taken in unusual quantities will produce an alkaline urine with its train of discomforts.

E. The physician should bear in mind that when a patient drinks a strong saline mineral water, he is getting 75 grains of mixed chemicals in each glass.

F. The physician must emphasize the fact that the waters, used internally or externally, or both, are only a part of the "Cure." A life regulated in every particular is imperative and this should com-

prehend the hours for food, sleep, rest, exercise, bathing, diversion, diet—in fact, the whole time of the patient during his sojourn.

The State has acquired many of the springs at Saratoga. The pumping has been stopped and the water is gradually resuming its original level. Analyses of the springs have, in the meantime, been made, and their authenticity is vouched for by the seal of the State. Two parks in the area of the springs have been laid out by the State; the High Rock is small but most charming with walks and benches for rest, in addition to its historical interest: the other comprises about 250 acres in the Geyser region and contains walks and drives, as well as many of the strongest springs.

Property has been purchased by the State, adjoining on one side the village park, and on the other the original Hathorn spring, on which it is proposed to erect a bath house which will be the equal of the best ones of Europe in every respect. It is also the intention of the State to construct a central drinking pavilion, to which the waters of the various springs will be conducted by piping.

The village has recently completed a most beautiful park in the center of the town, which serves our visitors for exercise, rest, and recreation. Open air concerts are arranged by the municipality and given three times a day by a popular band, and are free to our visitors. There is also in this park a Casino or Curehouse, which for elegance and beauty is unsurpassed. This was the famous Canfield club house, which has been rearranged and suited to its present use. Here the visitor may enjoy rest, reading, and writing rooms, and an interesting historical exhibit. Many social affairs are also given here both in the afternoon and evening, to which visitors are made welcome.

SOME OBSERVATIONS ON THE TECHNIC OF INTESTINAL ANASTOMOSIS, WITH SPECIAL REFERENCE TO A MODIFICATION OF MAUNSELL'S METHOD.

BY

F. D. GRAY, M. D., F. A. C. S.,

Jersey City, N. J.

(With nine illustrations.)

Intestinal anastomosis, or enteroenterostomy, is such a frequent procedure and one for which such a multiplicity of methods have been proposed and practised, that it may seem that the last profitable word concerning it has been uttered; yet there are few, if any, surgical problems of which this can truthfully be said.

The purpose of this unpretentious paper is not to offer anything especially original, but rather to recall and emphasize some cardinal principles relating to the subject and to recommend the revival of a technic which has fallen into disuse, perhaps for lack of a modification, which, so far as the writer knows, has not been applied to this method (although it is so simple and obvious that it would not be strange if others deserved the priority) and which, while slight in form, seems to add very materially to its efficiency—enough so, in our opinion, to make it the method of choice in the majority of cases.

The history of intestinal jointure is rather fascinating, but time forbids any extended reference to this aspect of the matter. Suffice it to say, that, like many other surgical proceedings, it has had its ancient, or at any rate medieval, and its modern phases. While the introduction of present-day methods of enteroplasty dates back no more than forty years, attempts along this line were made with more or less success during the Middle Ages.

Fabricus ab Aquapendente, in the latter part of the sixteenth century, says: "There are some fools who, before suturing the intestines, insert a cannula composed of elder pith or a piece of a dried artery of some animal or a bit of another intestine to avoid having the sutures carried away by the passage of food;" while according to Travers, the "Four Masters"—surgeon monks who practised in Paris toward the end of the thirteenth century—were credited with having used the trachea of a calf or a goose for the same purpose.

These crude efforts of the dark ages were, apparently, forecasts of the more practical and successful devices of modern times; of

Neuber's decalcified bone cylinders, introduced in 1884, to be followed by Mayo Robson's bone bobbins, Senn's bone plates, Murphy's button and more recently Soresi's rubber tube, not to mention the various cylinders of potato, turnip, etc.

Another class of operators, including Lee, Laplace, Halstead and others devised ingenious mechanisms for holding divided intestines in place during most of the suturing, the few remaining sutures to be inserted after removing these supports; meanwhile sutures in all forms, Lembert, Czerny-Lembert, interrupted and continuous, mattress, right-angled, etc., multiplied.

It is safe to say that, in the effort to attain an ideal method of intestinal anastomosis, during the past forty years, dozens of mechanical devices and as many varieties of sutures have been offered but, in the natural process of evolution, surgeons of to-day have come to rely chiefly on either internal fixation or support by the nonabsorbable Murphy button or Soresi catgut-looped rubber tube or else by the absorbable Mayo Robson bone bobbin (all aided by or combined in some way with sutures), or, on the other hand, resort is had to an all-suture method consisting of an initial (inner) row, interrupted or continuous, involving sometimes the mucosa only but usually all coats, reinforced by a second serous or Lembert row.

It would seem to be good surgical practice to select from these few methods some one technic in which to become proficient and to use as a method of choice. Equally it would appear wise, in making that selection, to choose the one which most nearly approaches the ideal for the majority of conditions under which intestinal approximation or anastomosis becomes necessary.

This naturally raises the question as to what are the fundamental requirements of a sound and generally applicable method of this sort. The answer may be stated as follows: first, and foremost, the technic should result in a secure watertight joint even in the presence of a considerable intraintestinal pressure from gas, while at the same time it should allow as much rapidity of execution as is compatible with safety; second, it should lend itself to unfavorable as well as favorable conditions, for instance, to an emergency operation in a distant farm house as well as to one of election in a well-equipped operating room; third, it should be adaptable to the different varieties of intestinal juncture, such as end to end, end to side and lateral anastomosis; fourth, it should provide hemostasis in the cut intestinal edges and leave, eventually, as little narrowing of the lumen as possible by undue infolding or flange formation of these edges.

When one studies the methods in common use in relation to these fundamental requirements it must be admitted that most, if not all of them, produce a reasonably secure joint, but that two at least—the Murphy button and the Soresi tube—accomplish the result in less time than any method requiring a double row of sutures. It is questionable, however, if either of these consumes less time than a jointure by means of a properly applied single row; while sutures penetrating all coats of the intestinal walls give as great if not greater holding qualities than can be attained by any other technic.

Next, it is obvious that reliance on any technic which calls for the use of a mechanical device of any sort, absorbable or nonabsorbable, does not meet the requirements of adaptability to emergency operations under adverse conditions as well as an all-suture method, for the operator may not have just the desired appliance at hand, while it may be safely assumed that he always has needle and thread. Whether or not there is any justification for the fear that a nonabsorbable device, like the Murphy button, may be indefinitely retained or may produce traumatism of the gut, it must be admitted that the surgeon who uses only a needle and thread for the purpose of anastomosis is wholly devoid of such anxiety. An objection to the Soresi rubber tube, carrying catgut loops, is that the number of stitches passing from one gut aperture to the other, in end to end anastomosis, is strictly limited to the number of loops carried by the tube and, where the segments to be approximated are of different caliber, I have seen an imperfect joint result. There is, moreover, the possibility that in using any of the more or less permanent intraintestinal devices, which for a longer or shorter period, take up a great part of the lumen, the flow through them may become blockaded on the proximal side by thickened masses of feces, thus establishing a secondary obstruction, a thing which does not transpire in the all-suture methods unless the bowel edges are unnecessarily infolded so as to narrow the lumen.

As regards the adaptability of the generally used methods to the three forms of approximation—end to end, end to side and lateral—there is little to choose as they all serve those purposes about equally well. It might be remarked just here, however, that while some surgeons believe that the *ultimate* anatomical result of end to end and lateral approximation are scarcely to be differentiated—there being, after some months, practically as uninterrupted a lumen in the side to side juncture as in the end to end—there is a difference, in the *immediate* formation, resulting in a slower fecal stream in the lateral than in the end to end method, which is a matter of not a little im-

portance where the operation is done as the result of a resection to relieve intestinal obstruction, a class of cases constituting a considerable percentage of the whole number demanding anastomosis. Here, at any rate, the end to end junction seems entitled to the preference.

Upon carefully weighing, therefore, the advantages and disadvantages of performing anastomosis on the one hand by the aid of some auxiliary device or on the other by the use of nothing but needle and thread—all-suture technic—the latter would appear to be the logical method of choice. If this be granted, it narrows the discussion to a question of preference for a technic dependent on either one or two rows of sutures. Without doubt the majority of those who, to-day, employ the all-suture plan are in the habit of using a double row and it must be admitted that, as a rule, the results are satisfactory; but in the writer's opinion, both on theoretical and practical grounds, the method is inferior to that which employs but one row of sutures, provided a technic be followed which permits a simple and direct manner of applying the same.

Two leading methods of anastomosis by a single row of through and through sutures have been advanced, the first by Maunsell something more than a score of years ago, the second by Connell about midway of that period. Each has one or more disadvantages that, apparently, have prevented their meeting with any general acceptance. The principal defects in Connell's method, which must be so familiar to all as to need no special explanation, are the waste of time in placing and tying a considerable number of mattress sutures (Connell's original suggestion) and the apparent difficulty in knotting of the last of this series or the termination of a continuous suture (Connell's second suggestion) so as to coaptate serosa with serosa. There is no doubt, however, that to Connell, more than any one else, is due the credit of demonstrating the superiority of the single through and through suture anastomosis; that in the first place it is more strongly retentive on account of penetrating all coats; that it is a distinct time saver by doing away with the introduction of a Lembert row, which is always a rather slow process, and that the knot of a through and through suture should, to prevent leakage, be within the lumen of the gut, although it is questionable if, in the present use of the almost noncapillary Pagenstecher thread, that point is of more than theoretical importance.

The Maunsell technic, as originally proposed by its author, and as still described, by such text-books as choose to explain it at all, is open to several objections. Having been for so long a time comparatively obsolete, it may not be amiss to refresh the memory by intro-

ducing a brief description of the method. Its essential and unique feature is an invagination or intussusception of the open ends, in end to end anastomosis, or of the corresponding parts, in end to side or lateral anastomosis, through a secondary, nearby, longitudinal incision or window on the antimesenteric border of the gut, the invagination being brought about by two or more traction sutures uniting the edges of the apertures to be anastomosed or by substituting for the sutures two or more fine hemostats according to Ullmann's suggestion. The resultant invagination places the apertures to be united in

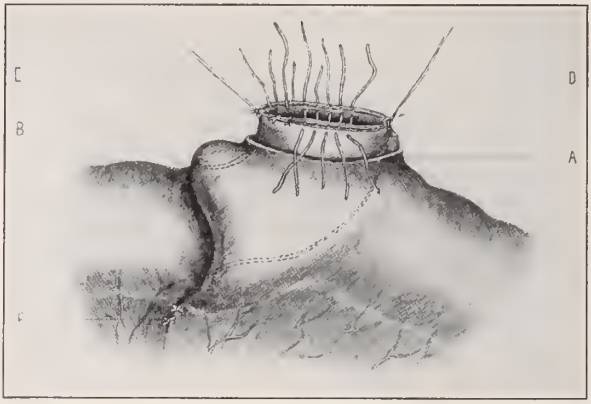

FIG. 1.—Entero-enterostomy by Maunsell's invagination method—the invagination accomplished. *A*, window in intussuscipiens; *B*, concentric ends of two pieces of intestine of equal size; *C*, antimesenteric traction-suture; *D*. mesenteric traction-suture; *E*, edges of mesentery sutured.—(*After Bickham.*)

the form of concentric openings, serosa applied to serosa and mucous surfaces exposed—in other words, in the most favorable possible position for accurate and rapid union by suture. Maunsell then completed the anastomosis by *interrupted* sutures penetrating all coats. The first objection to this method, and one which in our opinion is practically negligible, when contrasted with the greatly increased facility afforded in suturing, is the time involved in making and closing the small window as well as the slight additional trauma inflicted. The time consumed in making and closing a straight incision an inch and a half long on the convex border of the intestine does not amount to more than two or three minutes at most and can fairly be left out of the question and the danger attached is practically *nil*. If there is any prospect of its longitudinal closure unduly narrowing the intestine it can be closed *à la*

"Heineke-Mikulicz," in that way widening instead of narrowing the lumen.

Another criticism of the Maunsell technic, and in this case a valid one, is that it makes use, in the anastomosis, of *interrupted* sutures. This appears to be a mistake in several ways; first, the introduction and tying of numerous single sutures is a waste of time; second, there is a possibility of inverted gut edges held by interrupted sutures slipping past one another, owing to gas pressure within, before serous adhesion has become effective, with consequent leakage of intestinal contents; third, such sutures exert no hemostatic effect on the raw edges between them. To these objections may be added that they do not insure the ultimate necrosis and disappearance of

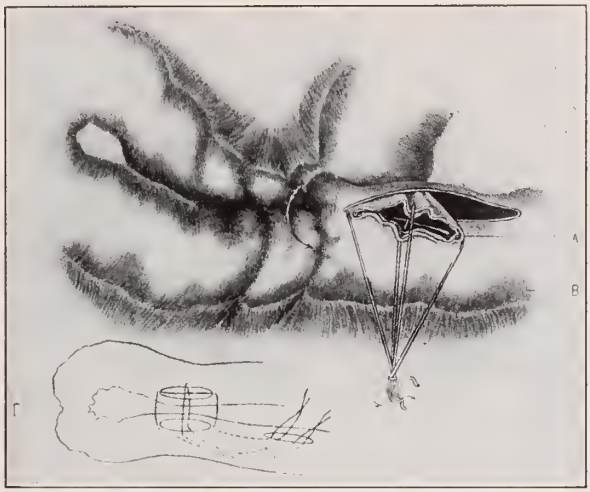

FIG. 2.—Lateral intestinal anastomosis by Maunsell's invagination method. *A*, intussusceptum drawn through window; *B*, intussuscipiens, with window in its antimesenteric aspect; *C*, diagram showing manner of placing traction sutures. —(*After Bickham.*)

the inverted edges, or flange, thereby leaving a more or less narrowed or obstructive zone at the situation of anastomosis—a defect which is even more apparent in the commonly used technic of two suture rows.

It must be self-evident that all of these objections applying to the technic by interrupted sutures disappear with the substitution of a *continuous, locking* suture. Such a suture should begin at the approximated mesenteric borders in the form of a circular stitch enclosing all four mesenteric leaves, the tail of the suture being left

sufficiently long to tie to the other end on its return. The suture may then be carried rapidly around the aperture of anastomosis, the stitches penetrating one-eighth to three-sixteenths of an inch below the free borders and placed about that distance apart, locked at each thrust by passing the needle under the loop before drawing it home, which should be done under considerable tension.

The final tie leaves a single knot that of necessity lies within the bowel, thus satisfying, for what it is worth, the Connell contention

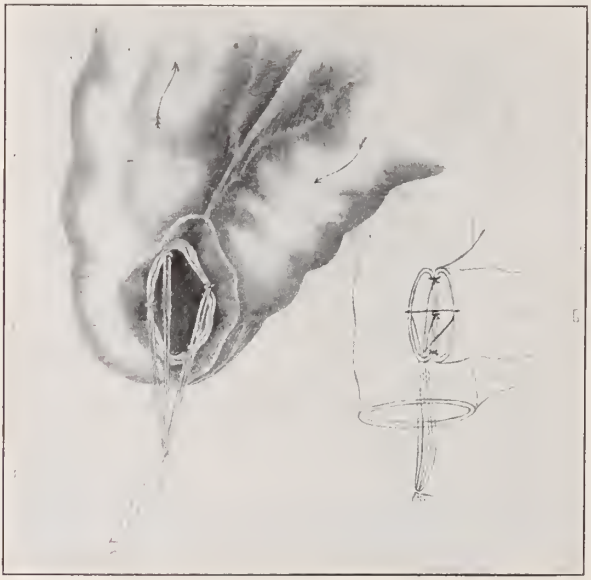

FIG. 3.—End-in-side intestinal implantation by Maunsell's invagination method. *A*, colon; *B*, ileum; *C*, free edge of lateral window in colon; *D*, free edge of end of ileum; *E*, Free, open end of colon; *F*, traction-sutures invaginating free end of ileum and lateral opening of colon through open end of colon; *G*, diagram showing manner of placing traction-sutures.

of the knot within the lumen though the noncapillarity of Pagenstecher thread, which should be used, makes that a matter of minor importance.

Nothing can exceed the ease, simplicity and rapidity with which the junction of these concentric apertures, whether end to end, end to side, or side to side, is effected, and nothing, also, can surpass the security of such union, the entire strength of each intestinal wall lending its holding qualities, while with the continuous locked suture there is no possibility of a slipping of either edge. Moreover owing to

the character of the stitch, if a proper tension is put upon the thread at the tightening of each loop, the tissues are in all probability gradually strangulated and in the course of a few days necrose and pass away just as the interposed flange between the segments of a Murphy

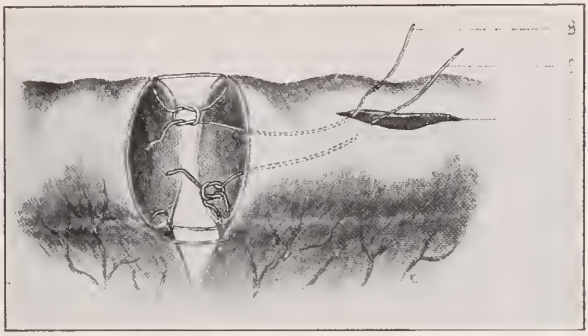

FIG. 4.—Entero-enterostomy by Maunsell's invagination method preparatory to invagination. *A*, window in antimesenteric aspect of intussuscipiens; *B*, manner of placing the antimesenteric traction-suture; *C*, manner of placing the mesenteric traction suture.

button does, leaving a clear unobstructed lumen. It will further be noted that this suture leaves no unconstricted portions of free edges and as a consequence hemostasis is effectual.

FIG. 5.—Maunsell's invagination method—with continuous locking suture.

After reducing the artificial intussusception the procedure is quickly terminated by closing the window with a row of right-angled Cushing Pagenstecher sutures.

I suspect that the general plan of the Maunsell invagination tech-

nic for anastomosis may appear complicated to one who has not tried it and perhaps defective to some who have followed the original and still generally described method of uniting the concentric anastomotic apertures by interrupted stitches, but I am quite confident that any one, with a mind free from established prejudice in favor of another technic, who will attempt the same general method with the substitution of a continuous through and through locked

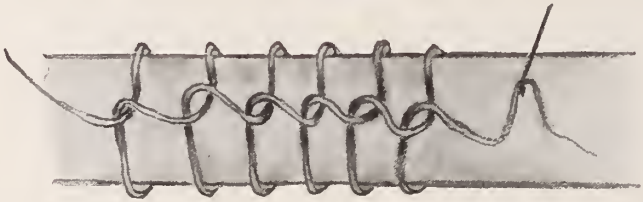

FIG. 6.—Detail of continuous locking suture, loose. Vertical view.—(*After Bickham.*)

stitch for the anastomosis will adopt it as the method of choice, The extreme facility for suturing afforded by the exactly related and freely exposed concentric apertures and the unusually secure joint resulting from a single, locked or buttonhole row of sutures make a lasting and favorable impression on the mind of the operator.

The method is as readily adaptable to end to side and lateral approximation as to the end to end anastomosis. A feature not so far mentioned is the facility with which a joint can be effected be-

FIG. 7.—Detail of continuous locking suture, loose. Side view.—(*After Bickham.*)

tween intestinal ends of different caliber; when the two barrels of gut are invaginated, the smaller within the larger, the latter is hugged down and made to nicely fit the former, like the rim of a wheel on the hub, by taking with each stitch a somewhat wider bite on the outer zone than on the inner.

The anastomosis (after resection) by this, or any other method, will be much facilitated by making absolutely linear cuts across the gut, without any irregularity whatever. The evenness of the result-

ing edges will greatly aid in making an exact joint. This straight edge may be produced by following, with knife or scissors, the side of a clamp applied to the intended line of excision but as it is desirable not to crush the walls, which are later to enter into the joint, a rubber shod clamp after the general style of a hemostat and just strong enough to sufficiently compress the gut walls is a convenience. The

FIG. 8.—Closure of window by cushing right angle suture.—(*After Bickham.*)

set of four presented here, which I have had made for the purpose, have proved more satisfactory than other intestinal compressors. The second pair are applied sufficiently far from the first, proximally and distally, after milking away the fecal contents, to insure empty segments of intestine for invagination purposes, before removal of the first pair. As you will notice, they are made of sufficient length

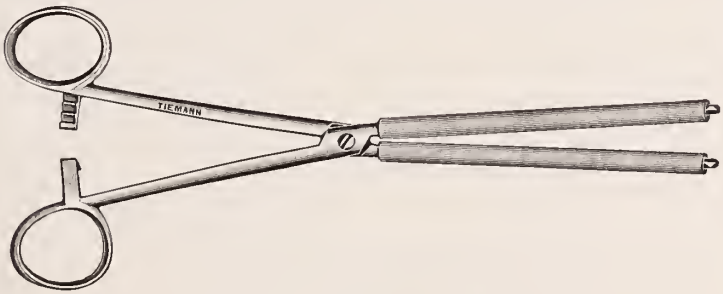

FIG. 9.—Intestinal compressor.

to pass across not only either small or large intestine but, also, a considerably distended gut.

The writer's experience with this modified Maunsell technic in eight cases during the past two years has been so satisfactory that he has been impelled to offer this little paper in the hope that some—more especially among the younger surgeons—who may read it and

who have not already become wedded to another technic, may by a trial discover that this old method with a trifling but effective modification may prove to more nearly than any other meet the necessary requirements.

It is not expected that the proposal to revive a technic so nearly discarded by the profession in general, no matter how modified, will be accepted by a large part of the Fellows present, but a discussion, whether in criticism or commendation, cannot fail to be profitable.

The accompanying illustrations and models I trust will make clear the difference between the original and the modified Maunsell technic.

DISCUSSION.

Dr. Francis Reder, St. Louis, Missouri.—It is very gratifying to listen to so laudable an expression of an operation that can really be called obsolete, yet the Maunsell operation is a classic, and will always remain so. When we consider intestinal surgery, the choice of technic depends principally upon the predilection and capability of the surgeon. There are two underlying principles in intestinal surgery that have long been appreciated. These principles are simplicity and safety: simplicity in suturing, and safety in the proper coaptation of the peritoneal surfaces long enough to cause good agglutination. I have seen many intestinal anastomoses, and I have, however, only seen one of the Maunsell type. That was performed at my request in Leeds. I have performed it twice myself for the purpose of demonstrating to the interns in the City Hospital of St. Louis its underlying principles. Why is the Maunsell operation not more popular? Simply because the advance in intestinal surgery has supplanted it with simpler methods.

The history of intestinal surgery is exceedingly interesting. It authentically dates back as far as the thirteenth century, and was practised by the four masters. These four masters were monks. Among the early contributors to intestinal surgery I may mention in this connection Albucasis, Guy De Chauliac, Le Dran, Ramdohr and Travers. I may state that the first recorded case of recovery following circular enterorraphy for complete division of the bowel was in 1730 operated by Ramdohr. Later came Astley Cooper, who was really the first to bring about an improvement in the method of suturing. In 1826 Denans made known a device which he introduced into the lumen of the bowel, a principle we find involved in the Murphy button. Others whose interests furthered intestinal surgery were Amussat, Duverger, Palfyn, Jobert, Thomas Smith and Gross.

The question arises, which of the methods we have at our disposal is the simplest and safest? The Maunsell operation is not as easy as a technical description would lead me to believe. We have our

difficulties with the mucosa just as we have with the other methods. The method has given us the principle how the knot can be placed within the lumen of the bowel. Connell with his classic stitch has given us convincing proof why a knot placed in the inside of the intestine is prone to be less dangerous than the knot placed outside of the bowel.

Formerly in all axial unions the mesenteric triangle was a great stumbling block. The dangers from this source are almost completely done away with in the Maunsell operation. In the other methods this space is obliterated by the introduction of a Lee mattress suture, a suture very similar in principle to that of Maunsell or Mikulicz. Although some operators use a preliminary or even a terminal stitch, the mattress suture as described by Lee is the accepted one by most surgeons in circular enterorraphy. In making the section for an axial union an unsuspected injury to an important blood-vessel may take place. This may prove serious. We need all the vascular supply that is possible in this method of union. It may also behoove the surgeon to sever the mesentery close to the bowel instead of cutting out a triangular piece, so beautifully shown in pictures. The excision of a triangular wedge from the mesentery appears to me to be a dangerous practice.

In an end to end junction it was not an infrequent happening to have a diaphragm at the site of union. This was very objectionable on account of the liability to obstruction. With the Maunsell method such a diaphragm did not exist. It is fairly claimed that with our present methods of suturing such a bowel inversion can be avoided.

The question has been raised in adverse criticism to the additional traumatism in the Maunsell method caused by the incision in the proximal end of the bowel. This is a weak criticism and does not weigh heavy against the method. What weighs against the measure is its complicated technic, now supplanted by simpler methods. If I may express an opinion, I would say that in my service at the City Hospital where I have had occasion to perform intestinal anastomosis for injury or for pathological conditions on a large number of patients, the lateral union, on account of its safety was given the preference. In some cases of injury to the intestinal tract requiring resecting the axial union was made, either with suture or Murphy button; there seemed to be, however, a lack of faith in this method when compared to the lateral unions.

With lateral anastomosis there is no contention with the mesenteric triangle. Injury to the arterial supply is minimized, there is a liberal coaptation of the peritoneal surfaces with no inversion of the edges and the opening for communication between the bowel ends can be made amply large. The results have been invariably good. The only complication that might arise is a leakage that could occur in case the closed ends of the bowel gave way secondarily.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—I am not going to undertake to go back to the twelfth century in discussing intestinal surgery, but I can go back about thirty-seven years. I

have seen a great deal of the technic of intestinal anastomosis. My own feeling in regard to intestinal surgery is that, as Dr. Reder put it, it is the man behind the gun. It is Crile, and only Crile, who can practise anoci-association and get such wonderful results.

With reference to the technic of intestinal anastomosis we must individualize our cases, in order to be successful, and I am glad that Dr. Gray has cut the red tape of conventionality and brought us back to that which is obsolete, but which perhaps is not obsolete after all. Everything dies except simplicity. There is that which is very simple in the Maunsell operation; there is also a great element of safety in it, as evidenced by the doctor's series of cases which he reported.

We have at the present time three types of anastomosis which are really fairly safe, the Maunsell, the Connell and the invagination methods in speaking of lateral anastomosis. The invagination method has a great deal which is attractive, but we are not sure that hemorrhage is not going to take place. We have no running suture to prevent hemorrhage from the margins of the gut that is invaginated. The Connell method is complicated, and the Maunsell has the element of possibly infection into the mesenteric edge. We need a clean, perfect technic when we divide the gut, and this should be done *from* the mesenteric edge, so that the knife does not push the fecal contents. In doing this work I make use of three mattress stitches about the mesentery, introducing one in the middle and one on each side; then I run a continuous suture up to almost the small buttonhole, and stop, and end with a few Lemberts. The circulation in the peripheral portion of the gut is so feeble that you do not need to fear hemorrhage, so I do a combination. I do not have the class of people to deal with that Dr. Reder has in St. Louis, nor do I do as much abdominal work as he does. I would speak against rapidity and fear in connection with this work. We much are very concerned with intestinal anastomosis as we are with Cesarean section, we think we have to do the operation in a short time and we are frightened if we do not do it in time. We must quit all that. If the case is one that needs time, give it. Do not fear that you have to hurry.

Dr. Albert Goldsphon, Chicago.—I am rather surprised that no mention has been made of the method published in recent years by Dr. Horsley, of Richmond, Virginia. It is better than any method I have ever used. It is better than the Connell, and does not require the Maunsell invagination. It consists of simply a row of stitches through and through, continuous, without the invagination, and the method is extremely satisfactory. I have tried it out on dogs, which is more difficult than in the human. The first knot is wholly within the lumen of the gut and the final one also recedes between the inverted edges. He lays stress upon the pressure effect of the continuous thread from one stitch to the other in arresting hemorrhage.

Dr. Hugo O. Pantzer, Indianapolis.—I am delighted with the paper and with the discussion that it has brought out. I do not

know that I would commonly resort to the Maunsell operation, but I do resort and trust to a single row of continuous through and through sutures.

As to the treatment of the last stitch, rather than incur delay by the use of McConnel's device, I put an extra Lambert stitch to enforce the possibly weak point which has shown itself sufficient. There is no occasion it would seem to me to employ the lock stitch here advised. I have used the simple throughout- all-layers, over-and-over suture repeatedly, and I have no hesitancy henceforth to use it. An examination six hours after operation will reveal satisfactory peritoneal agglutination, such as will resist the intraintestinal pressure.

Dr. Gray (closing).—I did not anticipate that many of the Fellows would approve of this method off-hand. Every one has a pet notion and a way of doing this sort of work. My chief purpose in presenting it was, in the first place, to present an argument against what is still, I am satisfied, a common practice, using one sort or another of intraintestinal supports, absorbable or non-absorbable. A great deal of that is done yet. I was talking with one of the younger men in New York a few days ago about this and he said, "I have not had the opportunity," although he does a good deal of surgery, "of making many anastomoses, but I use the Murphy button because it is the easiest. He looked this matter here presented over and said, "I am going to throw the Murphy button away."

I am gratified to find that no one has advocated the use of artificial devices in helping to make intestinal anastomosis. One ought to depend upon the needle and thread.

About this particular method of Maunsell, I believe any one who tries it will be impressed with the simplicity of the anastomosis and that is an important thing. If you try it you will see how simply and safely you can get a circular stitch around the mesenteric leaves and whip over the borders with a continuous suture, and I believe it is an additional safeguard to lock each stitch. It does two things: It controls hemostasis better than the continuous suture alone will do, and I believe it so strangulates gradually these tissues enclosed that they come away after a reasonable time just as the flange between the parts of the Murphy button. I may have bad luck with it some time, but I have not had so far. Two of my cases were junctions low down in the large bowel about the end of the sigmoid. In both of them the bowels moved on the table, and each patient had about fifteen to twenty actions of the bowels in the next two days which is a thorough test of the security of the junction. One patient went home in eleven days, and the other in thirteen days.

DELAYED UNION IN NONINFECTED EPIGASTRIC WOUNDS.

BY

MILES F. PORTER, A. M., M. D., F. A. C. S.,

Fort Wayne, Ind.

HAVING had several cases of delayed union in wounds of the epigastrium in or near the midline without apparent cause, I concluded to investigate the matter. As the result of an extensive search of the literature, there was found but one article bearing directly upon the subject. This article is by Robert T. Morris and was published in the *Journal American Medical Association*, June, 1911. The title of this paper, "The Gastric Weak Line," is very pertinent. O. Madelung has written an exhaustive article on "Postoperative Prolapse of Abdominal Contents,"(1) and gives a detailed report of all cases reported up to 1905; but in this article there is no suggestion that delayed union is peculiarly prone to occur in epigastric wounds. On the contrary, this author asserts that this accident is more likely to occur in wounds below the umbilicus. However, when one stops to think that much of Madelung's material came from an early period in abdominal surgery when the great majority of the so-called abdominal operations were really done for pelvic disease, one is led to disagree with his conclusion. Of Madelung's 156 collected cases, 82 were below the umbilicus. Certainly, in view of the preponderance of the subumbilical incisions that obtained at the time this material was furnished, the conclusion, that lack of union or imperfect union is more apt to occur in wounds below than in wounds above the umbilicus, is not warranted. On the contrary, the figures go to prove that this accident is more likely to occur in wounds *above* the umbilicus. Emil Ries(2) of Chicago, and R. R. Smith(3) of Grand Rapids, have both written on the general subject of separation of abdominal wounds, but both of these authors follow the same lines as does Madelung, with the exception that Ries considers only aseptic wounds which have been closed completely. Many others have reported cases of separation of the abdominal wound, but none so far as I know give any facts of importance not given in the articles referred to. Failing to find satisfactory material in the literature, I wrote a number of letters to surgical friends, asking them to give me their opinions and experiences. In referring

to these answers to my inquiries, I shall mention the name of the writer only. Where a name is given without further reference, the reader, therefore, may understand that a personal communication is the source of the information. I wish here to express my appreciation and thanks to the writers of these letters. Of the operators from whom replies were received, fifteen expressed the opinion that midline epigastric incisions were peculiarly prone to delayed union, and five had never observed any difference between wounds above and those below the umbilicus. Abbe says, however, that it is "notorious that incisions in the epigastric region need extra support in suturing." Jonas, also, who has had no experience with delayed union in epigastric wounds, attributes his freedom from this annoyance to the fact that he takes particular care in suturing these wounds and leaves the nonabsorbable stitches *in situ* ten days or longer. Harris says he has had no trouble since he has been using his "longitudinal wire suture." Drs. Oliver and Eastman, of Indianapolis, attributed the trouble they had had from delayed union to catgut and say they have had no trouble of this kind since abandoning its use. Bloodgood also says that in the cases investigated by him "the factor common to all is catgut." Deaver says that he sees no "reason why wounds in any part of the abdomen should not heal satisfactorily in the absence of infection."

While the evidence is not unanimous, yet it is certainly so nearly so as to leave no doubt but that the conclusion is warranted, that epigastric wounds are peculiarly prone to delayed or imperfect union.

In this connection it should be remembered that in a given case, the reparative process may be unusually slow, and yet no ill effects may follow, provided the suture material holds until the union is perfect, and in another case in which the reparative process is equally good, or bad, a hernia or separation of the wound with extrusion of viscera may occur because of absorption of the sutures before the union had been completed.

As to the causes of delayed union in epigastric wounds, it is obvious, of course, that among them will be found those which are common to all wounds, such as strangulation of the tissues from too tight sutures, infection, undue tension, and systemic debility. However, if it is admitted that epigastric wounds are peculiarly prone to delayed union, then it must follow that there are causes for this peculiarity.

Morris' theory, which is supported by some clinical and experimental evidence, is that "the failure of repair in wounds of the

abdominal wall after stomach operations is due to trophic or neurovascular disturbance associated with sensory nerve disturbance in the sensory zone of head."

W. J. Mayo and Willy Meyer are inclined to the opinion that the soiling of these wounds with the gastric or bowel secretions produces a necrosis of the cells and thus delays the union. Certain it is that one is impressed, in reading the reports of cases, with the preponderance of those wherein this soiling was likely to occur because of the fact that either the stomach or the bowel, or both, were opened during the operation.

A. G. Gerster says he has found union in wounds above the umbilicus "tardier in their union in all cases of malnutrition, especially cancer in its progressed stages," but he says further, "back of all there must lie biochemical causes as yet unknown to science."

Brewer also thinks tardy union in epigastric wounds is due to the fact "that so many of these incisions were exploratory for inoperable carcinoma, or for gastrostomy in an esophageal carcinoma." He adds: "Where malignant disease does not exist, I feel that they heal as readily as other wounds."

Powers, of Denver, says that all of his cases occurred "in people far reduced in general health." He reports one fatality following a rapid gastroenterostomy done in a man very far reduced, for a benign lesion. On the eighth and tenth days, when the stitches were removed, the union seemed good, two or three days later the wound fell apart, the small intestine protruded and death followed after quite a period of time from peritonitis.

Meyer, Eastman, Abbe, Lillienthal, Finney and others lay stress on the tension of the abdominal walls due to muscular pull as a cause of nonunion in epigastric wounds. Eastman refers especially to the sudden tension these wounds are subjected to through sneezing and coughing by reason of the close proximity of the diaphragm. The relatively poor blood supply to this region is suggested as a probable cause by Eastman and Crile.

The careful observations of Ries, which are supported by the experience of many observers, leave no doubt but that the delay in union or lack of union is usually most marked in, and may be entirely confined to, the deeper structures. The skin, however, may share in this tardiness.

In a case of my own, I found one week after a subtotal gastrectomy for cancer practically no attempt at union in either the skin or deeper structures. The silkworm gut stitches were allowed to remain for two weeks, at which time the union seemed perfect.

A. F. Jonas offers as the possible explanation of tardy union of epigastric wounds the fact that the abdominal walls in this situation are, excluding the fat, not so thick as they are below the umbilicus. He adds that the peritoneum is especially delicate, and that the inversion of the skin during the tying of the sutures is especially easy in this situation. These things make perfect coaptation harder to secure here and, moreover, even when it is secured the coapted surfaces are relatively narrow.

Leaving out of consideration the causes which are common to all wounds, we may sum up the causes of delayed union, more or less peculiar to epigastric wounds, as follows:

1. "A trophic or neurovascular disturbance associated with sensory nerve disturbance in the stomach zone of head." (Morris.)

2. Soiling of the wound with stomach or upper bowel contents.

3. Tension of the abdominal walls. This tension is of two kinds: constant from the lateral pull of the abdominal muscles, and intermittent, due to the action of the diaphragm.

4. Lack of blood supply.

5. Thinness of the abdominal walls.

The treatment naturally resolves itself into the preventive and the curative. The former is of much the greater importance, and it is of this branch of the treatment only that I will speak here. We know of nothing which will in any way modify the neurovascular conditions which may interfere with union, aside perhaps from attention to the general condition of the patient. The deleterious effects of soiling the margins of the wound with gastric or intestinal secretions should be avoided by protecting the wound with towels or pads.

By making the incision through one of the recti muscles, instead of through the midline, we may reduce to a minimum the bad effects of tension, anemia, and thinness of the wound margins.

However, as has been pointed out by Ries and demonstrated clinically in many cases, all these precautions may fail in securing prompt and satisfactory union. We should not lose sight of the fact that no matter how much delayed the union is, it is only necessary to keep the parts in apposition until union has been completed, to avoid ulterior results. This means that nonabsorbable, nonirritating suture material should be used and allowed to remain until the operator is satisfied that the union is secure.

It means also that in the after-treatment all reasonable measures should be used to reduce to a minimum the tension both continuous and intermittent. Coughing, vomiting, tympany, movements of the

patient, etc., all tend to increase the pull on the suture line, thus inducing separation of the coapted surfaces, even though the sutures hold. It is unnecessary to go into detail but it is well perhaps to mention the fact that these deleterious influences can be materially mitigated by proper selection and giving of the anesthetic, attention to diet, use of the stomach tube and enemas, giving of sedatives and restricting the patient's movements.

In this connection I should like to venture the prophecy that the fashion of getting patients up early, and the early removal of stitches will manifest itself, perhaps largely to our successors, in a harvest of herniæ. Many cases of separation of the wound are reported in the literature wherein the stitches had been removed at the end of a week or ten days and the patient allowed to get up or exert himself in some such way as to bring unusual strain on the parts. In these reported cases the accident was followed by extrusion of the viscera and immediate repair of the injury, but if the separation, starting at the same time and under the same circumstances, should be incomplete and progress gradually the patient will later on come to the surgeon with a hernia. For as has been thoroughly proven by Ries, the separation, when it occurs, always commences in the deeper layers and may be confined to them. An "audible snapping," occurring in the wound during coughing, sneezing, or other exertion (as happened in Ries' case), should lead to a careful examination of the wound and resuturing, if necessary.

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DISCUSSION.

Dr. George van Amber Brown, Detroit.—I have had three cases in my practice similar to those the doctor has described. The first occurred about ten years ago in a young lady in whom I had removed a large cystic ovary and did the so-called Gilliam operation. She did nicely and left the hospital in fifteen days. Two or three days after she returned to her home I was called and found the wound had separated down to the peritoneum. There was no suppuration. It was filled with one blood clot. A culture was made and staphylococcus infection found. She was returned to the hospital, and the peritoneum was closed with catgut and a layer of gauze placed between the peritoneum and the muscle for drainage, and the muscle sheath closed with catgut, and then she made an uneventful recovery.

The second case was that of a woman, forty years of age, on whom I did a panhysterectomy for carcinoma. She developed a postoperative pneumonia, and the wound opened down to the peritoneum. In that case we were unable to get a growth, and the wound was allowed to heal by granulation, and as she had pneumonia we did not think it safe to give an anesthetic. That was about two years ago.

A third case, which to me was most interesting, occurred in my service at the Providence Hospital about four months ago. This woman had been operated on in another city for cholecystotomy. She could not give the exact time of the operation, but about ten days subsequent to it the wound broke open, peritoneum and all. She was taken back to the operating room, the wound closed, and it healed this time by first intention. She later on in another city had an incision made near the median line and had a gastroenterostomy performed, and a few days later the same thing occurred as happened in the previous operation. I operated upon this woman for a very large fibroid tumor, did a supravaginal amputation, and about the fifth or sixth day following the operation she complained of a stinging sensation in her abdomen. In the evening the house doctor was called, and he thought possibly there was a stitch abscess. We had used catgut in closing layer by layer, and had a tension suture over the gauze of silkworm gut. He removed these sutures and lifted the gauze off, and found there was no evidence of abscess whatever. He simply strapped her up again, and during the night my phone rang and the intern informed me he had again been called up. This stinging sensation had increased to such an extent they called him. He found the intestines out upon the abdomen. In this case there was no culture made. I went to the hospital, had the woman taken up to the operating room, and simply closed the abdomen up again layer by layer. There was no drainage. I used silkworm gut, figure-of-eight, through the sheath of the muscle and through the skin, and she made again the third time an uneventful recovery, and since leaving the hospital I have examined her and find she has an excellent scar.

Dr. Lewis F. Smead, Toledo, O.—I want to report two cases of delayed union in right rectus incisions above the umbilicus. The first was a case of pyloric obstruction due to an ulcer in which a Finney pyloroplasty was done. The peritoneum was closed with fine silk. Through-and-through buried stitches of heavy silk, including muscle and fascia, were used along with a running silk suture to approximate the fascia. The fascia and muscle stitches were three-quarters of an inch apart and took in about three-quarters of an inch of tissue laterally, and were tied over the running fascial stitch. The skin was closed with a subcutaneous silver wire. At the end of ten days the silver wire was removed, and the wound was apparently clean. In the afternoon the wound was found open from end to end. It was closed immediately but the woman died on the seventeenth day of peritonitis.

Dr. Asa B. Davis, New York City.—We have seen a number

of cases of separation of the wound, probably five or six, although I cannot give the details now. The wound was not infected apparently, and by merely closing it with through-and-through silkworm gut sutures, there was primary and strong union, and no complications. In one or two cases the wound had been infected, opened part of the way down, and had been allowed to heal by granulation. In those cases hernia has developed, while in the others it did not. It is a rare thing for us to have the wound open after a Cesarean section. I do not recall a single one in any of my own cases.

Dr. Albert Goldspohn, Chicago.—It must be evident to almost all of us that when we try to close epigastric incisions the structures seem to come together with much more tension than lower down. There seems to be a shortage of material here more than in incisions below the umbilicus. My former chief, the lamented Christian Fenger, used to say, "If I made human beings, I would make them more generous in this part of the body." I happen to have had my first and only case that belongs strictly to this discussion. A well-nourished man, who had been having a history of gall-stone trouble for some years back, finally decided to be operated on. He had a number of stones in the gall-bladder, but no infection. It was a clean case, such as I have had no trouble with. These cases all unite except the drainage canal. This man was incised at the middle of the right rectus muscle; I never go through the median line without expecting to have trouble, but when we utilize the right rectus muscle we get a thicker layer of structures to unite and overcome the difficulty alluded to, that these structures are much thinner. We go through the outer aponeurosis of the rectus and through the rectus, or crowd the rectus to one side, and then go through the posterior sheath and into the peritoneum. In this case the peritoneum and posterior sheath of the rectus were together united by continuous catgut in one seam which held. The anterior layer was brought together with great difficulty and united by two continuous rows of catgut that had been hardened in formalin and boiled in water. The fat and skin were united by silkworm gut interrupted sutures that caught into the previous layer, so that there could not be any dead space formed. That man had an uncommon amount of gas or distention during the next week, but no temperature. There was no evidence of any trouble whatever. We had no idea there was going to be anything wrong with the wound until the interrupted silkworm gut sutures were removed after holding the outer parts of the wound together two weeks, then all at once the whole thing slid apart. There was not a drop of pus. There was drainage of bile through the tube at the upper end of the incision. When I make such an incision as I have described, and close it in the manner mentioned I expect primary union every time.

I am pleased to have this matter discussed here. The bottom of the wound consisted then of the first layer of sutures which took in the peritoneum, transversalis fascia, and probably some of the muscles attached to the posterior sheath of the rectus, not a thick

layer, and the wound separated a distance of two inches. I have never seen anything like that before. By this time his gaseous distention had been overcome. In narcosis I put in tension sutures, such as I have been in the habit of putting in in cases of amputation of the breast when the skin does not come together. I put these tension sutures over gauze buttons, the buttons being an inch and a half from the edge of the wound to relieve tension and to give the coaptation sutures a better chance to hold. Years ago I devised these buttons for use in cases of large ventral hernia. I brought the parts together with tension sutures of wire, in the form of mattrass sutures with gauze buttons, to transfer tension from the median line to the lateral portions of the abdomen. These tension sutures were in for more than three weeks. This man had them in for two weeks. I brought the receded portions of the recti muscles near each other. In the bottom of the wound the aponeurosis in front of the rectus muscle was necrotic. It was not the fault of the catgut, that held long enough, but the tissues became necrotic on account of excessive tension. So after bringing these things near each other for a week, I cocainized the parts and made a union under local anesthesia. He has now drainage chiefly from a rope of silkworm gut running from the top to the bottom through, and we hope we will get union.

Dr. Hugo O. Pantzer, Indianapolis.—I see the propriety on general grounds of limiting this discussion to the domain especially designated in the paper. On the other hand we may recognize that besides a local there may be a systemic causation and to include here the latter would seem apropos. I make this point on the basis of my second case where the patient was operated at a relatively well period in the course of a pernicious anemia. In this case rupture occurred three days after the operation and no vestige of suture material was found. All absorbable suture material including chromic gut of heavy type had vanished. The patient died of pernicious anemia a few years later. I had seen her one day, when the face and body showed normal proportions. The next day she was bloated from head to foot, looking like little else than a bag of water, so suddenly had supervened a dissolution by her fundamental disease. I cannot but think of this cause as having been active in producing the failure of union and the solution of the suture material upon the former occasion.

The cases of Dr. Davis are healthful women, who under the influence of pregnancy add to the vitality, *i.e.*, nutrition of the abdominal wall. Dr. Davis informs us that he has seen this accident only four or five times, then, in two cases associated with infection. The cases commonly operated by an epigastric incision pertain to individuals much reduced in their vitality. We may even assume the prevalence of an intensified waste in the immediate locality of the fundamental disease.

Dr. Frank D. Gray, Jersey City.—The only case of separation of the abdominal wall wound which I can remember in the course of five years or more was one in which a laparotomy was

done for resection of the intestine following a bullet wound, the bullet making six or seven apertures in the intestine—which I resected and subsequently united according to the method I described yesterday. The man made an uninterrupted recovery for a week; there was no evidence of sepsis, and at the end of a week he sat up. He was put in a roller chair and on his own responsibility went rolling around the ward. He went back to bed, had partial syncope and vomited. The wound separated. It was closed again, and he made an uneventful recovery with perfect union.

We ought to take the precaution in all abdominal incisions of closing the anterior sheath of the rectus by slowly absorbable sutures, not nonabsorbable, but twenty-day chromic catgut. If we do that, we will have these wounds holding long enough to give satisfactory union.

Dr. William H. Humiston, Cleveland, Ohio.—This discussion is interesting, confined as it is to incisions above the umbilicus. I do not see why we should have more difficulty in this region than in the region below the umbilicus. However, from the reports Dr. Porter received, nonunion occurs frequently. I believe the technic may be at fault in the great majority of cases. It is better to go through the muscle to the right of the median line and be very careful indeed not to strip up the fascia from the muscle. If you make a clean incision, separate the muscles carefully, and divide the posterior fascia carefully, I do not think union should fail to occur. In the majority of cases where the muscle is sutured, the sutures are drawn too tightly. If you use absolutely aseptic chromicized catgut and do not produce tension by the sutures, the healing should be uninterrupted. I have not yet had any such results as have been detailed here to-day. However, I have seen cases in which I thought the trouble arose from the sutures being too tightly drawn. The apposition should be gentle, and if the patient has fair resisting powers, I do not see why we should have any more trouble from an incision made above the umbilicus than one below it.

Dr. Porter (closing).—I was exactly in the same fix as Dr. Humiston, in that I did not see why we should have this accident, but the fact is we do have trouble, and I wanted to find out why we had it. There is no question but that there is a greater lack of union in a given wound above the umbilicus than in one below it. We have succeeded in substantiating the fact that there are several items to be considered in connection with it and which may be said to be the cause of this delayed union. Relative anemia and increased tension are causes, and another factor that is prominent to any one who carefully studies all these reported cases is that a large number of individuals operated in this region are in a very poor physical condition. They may have inoperable carcinoma or are extremely anemic from prolonged illness with gastric ulcer, and so forth. But when we come to think of all these different causes at work, here is the important thing it seems to me: There are none of them that we can do very much to rid ourselves of. By going through the muscle instead of the midline we get as much blood supply and as broad ap-

position as we can. We reduce to the minimum the excess tension by cutting through instead of between the muscle. Then we should put in a stitch that will not absorb, but will hold until union is perfect, no matter how much delayed. By doing all these things we have accomplished all we can do except one, and that is, when will the profession ever learn that it takes more than a week for a belly wound to get sound. It takes as long for the deep fascia of the abdomen to become perfectly united and sound as fascia as it does for the radius to become proficient as a radius. Every one of these cases almost without exception gives you the same story. They are allowed to get up in four or five or six days, and it is said the patients were all right, but the judgment of the surgeon was all wrong. No fascia unites and becomes fascia at the end of ten days any more than the radius does. I am not talking theory, I am talking absolutely proven facts; it takes the ordinary deep connective tissue to become mature, after it is divided, as long as it does bone. The moral is simply this: If you must get patients up for a good reason, namely, because they are old or there is more danger of pneumonia than of hernia, all right, get them up, but do not get them up with nothing to support their bellies but catgut sutures. You can use any method of suturing you please, but if you forget everything else and rely on suture material you will have some trouble. Madelung's paper proves how in these cases the wound separates now and again, no matter what method of wound closure is used, but as long as you keep the wound in apposition, while the delay is evident, you will avoid the ulterior result, and that, after all, is all you are after.

The point in regard to the tightness of the sutures is well taken. We all know, that one of Madelung's cases separated, and when he looked at it the whole suture line, including the fascia, muscle, and everything lay loose in the wound. When the sutures are tied too tightly they produce ischemia and drop out. All operators are liable to have this accident and the cardinal point to remember is, that you cannot get a man or a woman out of bed under ordinary circumstances a week after the abdomen has been opened without taking an unwarranted chance with human life. The wound has not healed. The sutures may hold, but the wound has not healed. There are many cases reported in which the sutures were removed at the end of a week or ten days. All right, if you are sure a belly wound has healed, but it is all wrong, if you are not sure.

Dr. Robert T. Morris, New York City.—I came in rather late and did not hear all of Dr. Porter's paper. I would like to ask him whether the nerve supply of the zone of Head was considered in connection with this question. It seems to me that is the crux of the whole situation.

Dr. Porter.—Yes, I referred to your paper, and also to the fact that it is the only article bearing on this line of thought upon this subject that I could find in the literature, either domestic or foreign, until I wrote my own.

RUPTURED GASTRIC AND DUODENAL ULCER.

BY

EDGAR A. VANDER VEER, M. D., F. A. C. S.,

Professor of Clinical and Abdominal Surgery, Albany Medical College;
Attending Surgeon, Albany Hospital,
Albany, N. Y.

After reading the papers of Dr. Ellsworth Eliot, Jr., in the *American Journal of Surgery* for October, November and December, 1908, and January, 1909, and that of Dr. John B. Deaver, in the *Annals of Surgery* for May, 1913, this subject would appear to be exhausted; but the progress in abdominal surgery during the past year has been so great, especially in the field of diagnosis, that it has prompted me to write this paper on a subject so ably presented by the above men. During the past six years, the advance in this field of endeavor has made far greater strides than in the interim between Dr. Weir's Presidential Address before the American Surgical Association, in 1900, and the publication of Dr. Eliot's paper in 1908.

From the very beginning of abdominal surgery, the subject of the diagnosis and treatment of ruptured gastric and duodenal ulcer has been second only in importance to that of appendicitis. That it is a much more frequent complication of ulcer of the stomach and duodenum than at first supposed, is now conceded by all abdominal surgeons. As our methods of diagnosis, clinical and otherwise, become more perfected, cases of general peritonitis, the so-called "idiopathic" peritonitis (or peritonitis of unknown origin) can, in quite a number of cases, be traced back to the stomach or duodenum as the source of the lesion. Though there have appeared in the literature during the past few years quite a few articles on this subject, the last word is yet to be written and much is still to be learned before the subject will be as clear and as well understood as that of appendicitis. Like appendicitis, this is true more particularly of the general practitioner and the internist than of the abdominal surgeon.

The important symptoms, while varying somewhat in the different cases, yet when studied carefully are found to run along somewhat similar lines. The history of a typical case might be epitomized as follows: A young person, generally a male, between the ages of twenty and forty years, apparently in good health, is suddenly seized with a severe stabbing pain in the right hypochondriac region and

rapidly goes into a condition of profound shock, with subnormal temperature, rapid pulse, sighing respirations, pale mucous membranes, moist and flabby skin, cyanotic in appearance, sunken eyes, drawn face, contracted muscles, legs possibly drawn up on the abdomen, heart sounds feeble, perhaps a severe pain secondarily in the right iliac fossa, muscles of the abdomen drawn tense, abdomen retracted, with board-like sensation, generally some nausea and vomiting and vomitus may or may not contain blood. Several hours after the onset of the attack the abdomen becomes distended, with all the evidences of a general peritonitis.

If now we obtain a careful clinical history, we learn that the patient has been treated for several years past for chronic indigestion or dyspepsia or possibly, in rare cases, for gastric or duodenal ulcer which had apparently been cured.

We find, from careful analysis of the symptoms, that acute pain is the earliest, most constant and most prominent of them all. This pain is sharp, lancinating in character, and localized in the right hypochondriac region. Secondarily, there may be severe pain in the region of the appendix. The original pain may or may not extend up under the left shoulder blade.

Next in importance to pain is tenderness, which is marked and lies over the site of the perforation. However, as the peritonitis increases, this tenderness becomes more diffuse and finally is general over the abdomen.

Following tenderness is shock, apparently out of all proportion to the lesion, and in no other condition, except in ruptured ectopic gestation, have I seen such marked shock. This profound shock is due, I believe, to some interference with the solar plexus, and we have a condition somewhat similar to that produced by a hard blow over that region.

The pulse at first is apt to be slow and full, but within a few hours after the perforation its rate rapidly increases, soon becoming thready, and almost imperceptible at the wrist. Temperature at first subnormal, in one of my cases going down to 96° F., then gradually rising in keeping with the pulse. In none of my cases did I have an opportunity to take the blood pressure, no doubt a wise step which would, I am sure, show a lowered resistance. The blood, of course, shows a high leukocyte count, as would be found in any infection.

Nausea, when present, occurs in the first few hours after the perforation and rarely persists for a longer period than three or four hours, when it ceases, only to return when general peritonitis has

set in, when we get the fecal vomiting preceding dissolution. Constipation is absolute from the beginning.

Diagnosis is fairly simple if we are able to obtain a complete clinical history. In this history the point to be brought out is that the patient has suffered for years with digestive disturbance. This is our first and most important diagnostic point. The second is the sudden attack of pain, with tenderness over the right hypochondriac region, with secondary involvement of the region over the appendix, and profound shock.

We now come to the most interesting and at the same time the most important step, the differential diagnosis. The first condition which may be confused with perforation is that of an acute gangrenous appendicitis, because of the pain very quickly shifting to the appendicular region, due to the fact that the free fluid in the abdominal cavity rapidly gravitates to the right iliac fossa. Here differentiation is based mainly on the clinical history, the location of the pain in the beginning, and the severity of the shock. In appendicitis, constipation is an important factor and the pain never extends up under the shoulder blades. These last two points should promptly exclude appendicular trouble.

Ruptured gangrenous gall-bladder has occasionally been mistaken for this condition. Here again the clinical history is essential; for in the majority of cases we are able to observe that the patient generally presents a picture of deep jaundice, and the pain always extends to the right shoulder blade.

Occasionally a stone in the right kidney, which has taken upon itself to migrate toward the bladder, might be mistaken for a perforation, but careful examination of the urine showing the presence of pus and blood cells, the primary site of the pain in the right lumbar region and referred along the course of the uterus into the pelvis, enables us to differentiate.

Also a twisted ovarian cyst on the right side may be confounded. However, if we obtain a history of painful and irregular menstruation, with pain less acute, with primary lesion in the right iliac and hypogastric regions, secondarily in the right hypochondriac region, and in contradistinction to the primary and secondary pain in perforation, we are assured that the condition is an ovarian one. In perforation of the bowel, we have more diffuse pain over the abdomen, the other symptoms being the same. In ileocecal intussuception, as a rule, we have the presence of the sausage-shaped tumor which can be readily palpated, as well as the bloody stools.

There have been reported a few cases wherein a condition of

ruptured extrauterine pregnancy had been mistaken for that of ruptured gastric or duodenal ulcer, but the symptoms in the former are so definite that these conditions should not be confused.

Within the past four years there have entered my service at the Albany Hospital five cases of ruptured gastric and duodenal ulcer. Four of these cases were operated upon within four hours after the rupture, three surviving. The fifth case was operated upon thirty-six hours after rupture and survived barely long enough to be returned to his room.

Case I.—C. G., aged twenty-four, born in United States, electrician, referred by Dr. James F. Rooney. Family history, negative. Personal history, negative. Past history: For a year patient complained of mild attacks of indigestion. Would "belch up" gas, and appetite impaired; experiences a sense of hunger at short intervals and would eat a little at such times. These symptoms disappeared, and not until September 13, 1910, did he complain again. He said that he had pain in the "pit of his stomach," about meal hours. With this came a sense of hunger, which proved to be a false appetite, as he was able to partake of but very little food. This condition prevailed until September 22. On that day about 7.30 P. M., he rose from his chair, when suddenly he experienced severe "cramps in his stomach." He was very dizzy, pain in the abdomen continued with nausea and later vomiting. His condition grew worse as time passed. At nine o'clock he was seen by Dr. Rooney, who advised him to go to the hospital for immeditae operation.

Patient entered the hospital at 11.30 P. M. and immediately operated upon. At the operation a perforated gastric ulcer was found at the pyloric end of the stomach just alongside the sphincter. The perforation, which was the size of a pea, was closed with interrupted Lembert sutures. Wound closed with cigarette and rubber drainage. Stab wound in the right iliac fossa, and drained in the same way. Considerable fluid had collected at this point. Cigarette drain removed at the end of forty-eight hours; rubber tube allowed to remain for a week. Patient left the hospital at the end of three weeks and, when last heard from (a year ago) was still well.

Case II.—P. M., aged forty-six, born in England, newsdealer, Referred by Dr. Baxter T. Smelzer. Family history, negative. Personal history, negative. Past history: Practically the same as Case No. I. Has had "stomach trouble" for twenty years. While finishing a hearty supper he was seized with an excruciating pain in the region of his stomach, his condition bordering on collapse. Patient was at once seen by Dr. Smelzer, who called me immediately in consultation. Operation was advised and accepted. Conditions found were similar to Case No. I. Patient made a good recovery and has been well ever since.

Case III.—S. M., aged thirty-six, born in United States, traveling salesman. Referred by Dr. L. E. Blair. Family history, negative. Personal history: Heavy drinker and smoker. Past history:

For ten years, up to five years ago, he had complained of more or less indigestion, with eructations of gas, and all the symptoms of chronic indigestion. The last five years he had been exceedingly well. While seated in a barber's chair, three hours after partaking of a heavy meal, he was suddenly seized with severe pain in the "pit of his stomach." The symptoms indicated perforated ulcer and he was ordered to the hospital. Owing to his wife's absence the operation was delayed four hours.

A perforation of a duodenal ulcer, about 1/8 inch in diameter, was found. There was considerable free fluid in the abdominal cavity. Patient did well for several days, when he suddenly developed general peritonitis, went into collapse and died within twelve hours. Autopsy not allowed.

Case IV.—G. A., aged nineteen, born in United States. Laborer. Family history, negative. Personal history, negative. Past history: Had been troubled with more or less "biliousness," all his life. After eating a hearty meal he was suddenly seized with pain in the epigastric region which compelled him to go to bed. He was treated with home-remedies for twenty-four hours. Forty-eight hours after the attack patient was seen by me. Diagnosis: General peritonitis due, either, to a gangrenous appendix or a ruptured gastric- or duodenal ulcer. As a secondary incision was necessary in the appendicular region, the primary incision was made in the right iliac fossa. This was found filled with fluid. The appendix, while somewhat inflamed, was, evidently, not the seat of the trouble. An incision in the right semilunaris, over the duodenum, revealed two perforated gastric ulcers. Usual operation. The patient behaved very poorly while on the table. The operation was, therefore, somewhat hurried. Patient died within two hours.

Case V.—W. S., aged twenty-eight, born in United States, fireman. Family history, negative. Personal history: Indulges in alcoholic beverages. Past history: a year ago, patient fell down stairs and fractured right knee-cap. Did not complain of any stomach trouble at that time. While seated at the supper table he was seized with a pain in the right hypochondriac region, followed by collapse. Pulse and temperature normal. Reached hospital two hours after seizure. Operation revealed small perforation of the duodenum with very little leakage of the intestinal contents. Usual operation. Patient made an uneventful recovery.

We notice in these histories that the patients were all comparatively young men, who had for years complained, more or less, of chronic indigestion; but of which they had seemingly recovered. While apparently in the best of health, they were suddenly seized with a severe pain in the epigastric or the right hypochondriac region, and presenting at once all the symptoms of profound shock. The severe pain in the epigastric region was quickly followed by a secondary pain in the right iliac region, together with rigidity and dullness on percussion all along the right side of the abdomen. All

of these symptoms occurred very rapidly after the perforation. The perforation came on without premonition. In all of the cases the patient were, apparently, enjoying better health than usual when the perforation occurred.

So far as the treatment is concerned, there is but one thing to do: operate as soon as the diagnosis is made. I prefer a free incision in the right semilunaris. This admits of ready inspection of the entire right side of the abdominal cavity. Experience has shown that the majority of perforations has occurred at the pyloric end of the stomach or the first portion of the duodenum, and this incision gives us an exposure of the field and plenty of room to work. The perforation having been located, it may be closed in one of several ways: A couple of continuous Lembert sutures are amply sufficient and they are quickly introduced. If possible, the sutures should be inserted parallel to the long axis of the stomach or duodenum, so as to interfere as little as possible with the circumference of the gut when the scar contracts.

As a rule, the condition of the patient will not permit a gastroenterostomy, as some advise. If this operation is necessary it can be done subsequently when the patient's condition is improved. Rubber, or a cigarette-drain, should be placed in the lower angle of the wound, down to the point of perforation. A second incision should be made in the right iliac fossa, and drainage inserted.

A paper of this sort should be presented to an assembly of physicians and surgeons, rather than surgeons only, as the surgical treatment of the condition is pretty well fixed. It is for the general practitioner, who is first called in to see the case, to make the diagnosis and to suggest the treatment. He should understand that an operation, not expectant treatment, is indicated.

DISCUSSION.

Dr. John F. Erdmann, New York.—This is an exceedingly interesting subject. As to the question of perforating duodenal ulcers, I have reported and presented six patients this year to the Surgical Society of New York up to the seventeenth day of March. I would like to take exception to what Dr. Vander Veer has said in regard to the treatment at the present time. In the first seven or eight cases I had, I excised the perforation with the surrounding induration, and sewed the freshened edges together as though I had done an enterostomy or gastrostomy. In addition gastroenterostomy was done. Gastroenterostomy can be performed within five or twelve minutes without any trouble. If you take a case of perforation from duodenal ulcer and operate on it in the first twelve hours, with or without clamps, the question of defiling the peri-

toneum is not one of great moment. You are not doing the patient any harm, but a great deal of good, in that you eliminate the factor of a second operation.

With reference to the symptomatology, we should take a careful anamnesis of all abdominal conditions. We will find in the majority of cases of duodenal and many pyloric ulcers the syndrome described by Moynihan evident; this symptom is pain preceding the expected meal, easier or abolished by taking some food or alkalies, that is, at four or five o'clock in the morning preceding breakfast, or at eleven o'clock in the morning preceding luncheon, or at six o'clock in the evening preceding dinner, there will be a characteristic pain. This was well shown in a patient, fifty years of age, who, when sitting at his desk, was seized with excruciating pain in the abdomen, was carried to a sanitarium and a diagnosis was made of acute perforative appendicitis. When I saw him in consultation I said, "This is not appendicitis, he is suffering too much pain for the trouble to be appendicular, let us take the history." The first item of information the patient volunteered was that at about eleven o'clock in the morning, preceding luncheon, he would have pain, and after taking his luncheon relief would follow. Again, at six o'clock in the evening, for several months, just preceding dinner, pain would come on, which would be relieved by dinner. He would suddenly awaken between four and five o'clock in the morning, with pain. I tie my diagnosis as tightly to this symptom as Moynihan does—the pre-expectancy meal pain with relief in taking food. While I was connected with the Gouverneur Hospital in my earlier years, ten years ago I operated on thirteen cases of perforating ulcer in which infolding of the peritoneum, etc., was carried out without gastroenterostomy. I do not believe infolding of the peritoneum is curative in cases of duodenal ulcer in the face of the induration we have, and I have never seen a case in which the ulcer was not markedly indurated, but the infolding produces a cure for the perforation only. I believe in the majority of duodenal cases we can excise the induration without difficulty or we can do a simple excision while doing the pyloroplasty of Finney, or do an excision, sewing up the freshened edges and doing a gastroenterostomy subsequent to it as stated by me before.

In regard to drainage, I resort to it for the first twelve hours. After the abdomen is washed out I sew up the wound tightly, in a few instances. When drainage is needed, I prefer a cigarrette drain which is kept in, say for forty-eight hours. In these cases I do not hesitate to remove the appendix. I believe with others that the appendix has been a marked associated cause of the onset of this disease in many instances and therefore should be removed.

Dr. Robert T. Morris, New York City.—I would take exception to the idea that we must always stop to suture in these cases. What are we going to do with a patient who is in collapse? I am not talking about the patient who is able to discuss the next governorship of New York or talk about the war, when you go to see him. I am talking about the patient who does not know whether you are in

the room or not. To illustrate my point, I will make a schematic drawing on the blackboard. We will call this the stomach, and this the duodenum. Let us say we have a perforation at this point (indicating), and we will call this the abdominal wall. Let us suppose the patient is in collapse. The thing to do is to make an opening quicker than lightning with a pair of scissors, and hear the gas whistle. If I cannot see the perforation I can at least see where the whistle is coming from. If I can get a tube in there, a split tube, and leave it right there, I can take another split tube with a strip of gauze and put it alongside. I do not stop to look for the perforation. There may be cucumber, and there may be cheese, loose in the peritoneal cavity and you will find the patient can take care of them pretty well. I have had three patients who got well after that treatment. Knock down the peristalsis with opium. Overlook the cucumber and cheese, and they will come out through that hole in less than three days. (Laughter.)

Dr. Miles F. Porter, Fort Wayne, Indiana.—There is possible danger in emphasizing the question of correct pathologic diagnosis in this and similar conditions, when you bring a message especially for the general practitioner. Let us not forget the fact that our patient comes to us, not for the purpose of an exact pathologic diagnosis, but to be cured, and every operator in this room of large experience can refer to cases by the dozen that have died while they have been waiting for a correct diagnosis, either at the hands of the general practitioner or less often at the hands of the surgeon. What different does it make whether the patient has a gastric ulcer, a duodenal ulcer, an inflamed appendix, a perforated typhoid ulcer, or a ruptured tube? I say, practically, what difference does it make? He wants his belly opened, he wants it done quickly and wants to get well. Therefore, I say, there is a possible danger in harping on this question of diagnosis. The fact of the business is, when we have come to a decision and have opened the belly, we find we are wrong. If you have a working diagnosis, and know the belly ought to be opened, open it, and do what is proper so that the patient can get well.

Dr. Budd van Sweringen, Fort Wayne, Indiana.—I want to give a reason for doing more than the immediate needs in an operation of this kind by the recital of a case. I saw a man at a farm house who had perforated gastric ulcer. The belly was opened. He was in extremis. Perforation had occurred fifteen hours before I saw him, so that nothing was done, except to close the ulcer and provide drainage. The subsequent history of the patient was extremely satisfactory for a week, when he suddenly had a violent gastric hemorrhage and expired.

I merely recite this case as a reason for extended work if it is possible to do it. I think if this ulcer had been excised, or if there had been a gastroenterostomy done, the patient might have escaped death from hemorrhage.

Dr. Charles W. Moots, Toledo.—This is an interesting subject to me because of a case that happened in my own family. A

diagnosis was made of perforated duodenal ulcer in the case of my wife, and in two hours Dr. Jacobson opened her and did what Dr. Morris said he did. He felt she would get well. He went to Europe. She got over the attack, and three or four months later Dr. Smith did a gastroenterostomy, and she is living and has been quite healthy since.

Dr. Thomas B. Noble, Indianapolis.—I am somewhat carried away by the striking position taken by Dr. Morris. I am profoundly impressed by the remarks he has made relative to his disposition of the pie and the cucumbers and the cheese in the upper abdomen, but what is he going to do with the pickled pig's feet that may exist in the pelvis? I have had this experience and have found these articles in the upper abdomen and the pickled pig's feet in the pelvis which, I believe, if I had allowed to remain, would have carried this man to the golden paved streets of the new Jerusalem, but instead of that he got well by opening the abdomen thoroughly and cleaning it out. Here comes in a question: I have a success in which, after cleaning out the bowels, cleaning out the stomach, cleaning out the intestine by stripping it and by thoroughly evacuating the abdominal cavity of its contents with gallons of salt water, my patient recovered. Which of these cases shall we treat according to the method of Dr. Morris, and which shall we treat according to the way I have just described? Therein lies the question. You will be damned if you do it in some of these cases, and damned if you dont do it in others, so it is largely a question of surgical judgment in the individual case. We cannot follow any rule. In some of these cases it is better to do a two- or three-minute operation, and in still others we had better be thorough and do a complete operation. We cannot take a dogmatic position and lay down rules relative to this class of cases, but we all need to know about the pathology and sequence in connection with these cases.

Dr. Morris.—I did not make any dogmatic assertion. I agree with Dr. Noble that it is a question of surgical judgment.

Dr. Frank D. Gray, Jersey City, New Jersey.—The most practical point made in this discussion is by Dr. Porter, that it is unwise to wait for an accurate diagnosis, and yet I would say you must make *a diagnosis*, but that diagnosis must be an acute abdomen. If your diagnosis is one of acute abdomen you are justified in doing a laparotomy and accomplishing whatever is necessary when you get in. If it is a chronic abdomen, you can afford to wait and make a differential diagnosis.

BILIARY SURGERY.

BY

JOHN F. ERDMANN, M. D., F. A. C. S.,

Professor of Surgery in the New York Post-Graduate Medical School and Hospital.

THE greater portion of this paper was read before the New York Surgical Society, April 22, 1914. I have felt that an additional consideration of the questions of two-step operative procedure, etc., with a brief reference to the *x*-ray diagnosis, would be of value.

During the period of time covered by this paper—from January, 1910 to April 10, 1914—270 patients were operated upon, with 13 deaths—a mortality of 4 plus per cent. The majority of these patients were subjected to operative interference upon more viscera than the gall-bladder alone, or the gall-bladder and duct were interfered with, thereby insuring a greater risk as to mortality than individual operations would give. It is with a view of presenting the causes of death and the operations done that I offer this paper.

Age.—This varied from twenty-two to seventy-four years.

Sex.—The number of patients in whom the sex is recorded is 242; of these, 154 were females and 88 were males—rather a sharp contrast to the records of Whittemore of Boston, published in the *Boston Medical and Surgical Journal*, October, 1913. He reported a series of 595 cases in which there were 441 woman and 154 men; almost three times as many females as males.

Type of Disease.—My records show 54 cases of acute cholecystitis; 34 cases of gangrenous cholecystitis, and 115 cases of cholecystitis not otherwise classified; this series included all varieties, from noninflammatory to hydrops. There were 6 cases of perforated cholecystitis; 6 noncalculous; 4 malignant; 8 hydrops and 23 cholangitis cases. In addition, acute hemorrhagic pancreatitis, with suppuration or sloughing, was observed six times.

The operations recorded were as follows: Cholecystostomy, 125 cases, with 5 deaths. Cholecystectomy, 96 cases, with 4 deaths. Choledochotomy and transduodenal choledochotomy, 5 cases in all, with 2 deaths. Cholecystostomy with choledochotomy, 27 cases. with 1 death. Cholecystotomy, with and without combined operations upon the duct, 142 cases, with 6 deaths. Cholecystectomy, with and without combined operations upon the ducts, 123 cases, with 5 deaths.

Here it will be well to note the relative mortality rates in these two types of operation as a prognostic factor in advising their performance. In the so-called lesser mortality type of operation, cholecystostomy, with and without combined operations upon the ducts, I report 142 cases, with 6 deaths—a mortality of 4.2 per cent., while in the graver operation of cholecystectomy, with and without combined operations upon the ducts, I report 123 cases, with 5 deaths, a mortality of 4 plus per cent. Attention is also called to the difference in the results after cholecystostomy alone, 125 cases, with 5 deaths, and after cholecystectomy alone, 96 cases with 4 deaths. In both the mortality was about 4 per cent.

Choledochostomy, singly or combined with operations upon the bladder, was done in 49 cases, with 4 deaths, about 8 per cent. If the choledochostomies, without additional bladder operations, be considered, the mortality in this series is exceptionally high—5 choledochostomies of this class being done with a mortality of 2, or 40 per cent. These two deaths are easily explained: one occurred on the fourth day from embolism, and the other was due to a compression—interstitial fibrosis—of the liver cells in a patient 65 years old, in whom I opened the common duct, with negative findings, four years after a primary cholecystectomy and choledochotomy for pronounced cholangitis. Added to the cellular change in the liver in this case, was a marked nephritis, which was the final cause of her dissolution, as there was almost complete anuria for four days preceding her death.

Secondary Operations.—Under this term I include those patients who were operated on a second or a third time—not those considered as two-stage operations. I can find the histories of but eight such cases in a series of 270, and these I will mention briefly. All were operated on by surgeons of repute, and I have no reason to doubt that the operations were as complete and thorough as the circumstances permitted. The following case presents a point of interest as to the length of time necessary for stones to grow to some size:

Mrs. B was operated on six years ago in one of our large hospitals, a cholecystostomy being done. She remained free from pain for about two years, then all her former symptoms recurred with increased severity, and there were signs of duct involvement. I then operated on her, exposing a very long, adherent gall-bladder, containing thirty-three stones, none of them smaller than a marrow-fat pea. Four stones about the same size were also found in the common duct. A cholecystectomy and choledochotomy were done, together with the removal of the appendix. The patient made a

prompt recovery, with no recurrence of any kind up to the present time.

It is but fair to the operating surgeon in this case to assume that in a case of election, as this was, we can preclude the possibility of his leaving thirty-three large stones in the gall-bladder. Therefore, either these stones were conveyed as fairly sized ones from the liver into the bladder, or else the growth of stones in the gall-bladder can be very rapid. The common duct invasion must be considered by itself, as this part of the hepatic system was not operated upon at that time. We are all aware of the presence of hepatic stones, and in view of this established fact, I advance the above argument as to the possible migration from the liver to the gall-bladder.

The second patient in the series was a young woman who was operated on a year ago for an acute gangrenous (?) cholecystitis. No stone was found at the time. She came to me with a persisting fistula, and upon exposing her gall-bladder, a stone the size of a robin's egg was found. This stone, I am quite sure, was overlooked at the first operation. A cure was established in two weeks by doing a cholecystectomy.

The third patient was a physician in whom a cholecystostomy was done hurriedly two years ago in the Presbyterian Hospital, for a suppurative condition, and owing to profuse hemorrhage from the surrounding tissues, packing was resorted to. Two years later he again developed marked symptoms—with great difficulty I was able to do a successful cholecystectomy with appendectomy.

The fourth case was one of my own. The patient was a female, twenty-two years old, with an acute hemorrhagic pancreatitis. In addition to establishing very liberal drainage, I did a cholecystostomy, removing many stones, some of them the size of a marrow-fat pea. Speedy recovery took place, the drainage wound healing promptly. Only recently, about three years later, I was compelled to explore her for abdominal pains similar to those she had had before her first operation, with the result of finding an atrophied and contracted gall-bladder containing muco-pus and an amber-colored stone, entirely different from those originally removed, and about the size of a very large marrow-fat pea, impacted in the cystic duct. A cholecystectomy and appendectomy were done, and speedy recovery followed.

The fifth patient was one in whom a rapid cholecystostomy was done twenty months ago in one of our large hospitals by a man of very extensive experience. When I saw the patient, she said she

had had a period of eleven months freedom, and then all her symptoms of a stone in the duct recurred. At this time the patient had a temperature of 103.6° F. and was profoundly jaundiced. An immediate operation revealed a small, purulent bladder and one large duct stone. Upon opening the common duct, no bile escaped; in fact, acholia persisted for fifteen hours, and then only the slightest evidence of bile was present. Twelve hours later, however, bile began to flow in fair amount. In this case a cholecystectomy, choledochotomy and appendectomy were done, and the patient made an excellent recovery.

The last of the series I wish to report was in a Catholic priest of about forty years, who was an athlete and worked hard in his parish. When I saw him, in consultation with Dr. Ludwig Kast, he said he was suffering from pain in his abdomen, similar to that in a previous attack, for which he had been operated on thirteen months before. That operation, I was informed, was a cholecystostomy and choledochostomy. Conditions arose that demanded an exploration. A cholecystostomy and choledochotomy were again done, retaining the gall-bladder because the common duct was very much thickened (cicatricial) and a chronic pancreatitis existed. The fact was kept in mind that it might be necessary at some future date to do a cholecystenterostomy. This patient went through the most profound manifestations of shock and collapse for four days that it has ever been my misfortune to see, showing all the evidences of a severe toxemia, similar to those observed in acute pancreatitis. It is now about one year since his second operation, and no biliary symptoms have been complained of.

Combined or additional operations other than those of the hepatic system:

Appendectomy.—Over ten years ago I called attention to associated disease of the appendix, using the unfortunate term "dual disease," instead of coincident or associated. This fact was well borne out by the second operation upon one of our well-known western surgeons while on a visit to the east during the past few years. I always remove the appendix when the patient's condition permits it, or when the infection can be limited to the gall-bladder zone. In this series, I have done appendectomy with cholecystostomy sixty-seven times; with cholecystectomy forty-nine times; with cholecystostomy and choledochostomy six times, and with cholecystectomy and choledochostomy fifteen times, making a total of 137 appendectomies in the entire series, over 50 per cent. Of the above number, it happens that the appendix has occasionally been the

primary offending member, and the gall-bladder the secondary. One patient with a gangrenous appendix gave a history of gall-bladder trouble for years; she was also two months pregnant. She had an appendectomy and cholecystostomy done without disturbing the pregnancy. In one case a Finney pyloroplasty was done, and in one a gastroenterostomy with choledochostomy. A partial gastrectomy for carcinoma, with cholecystectomy and choledochotomy were done in a woman who was afterward shown at a meeting of the New York Surgical Society. In this case, three years before, I had done a right nephrectomy, a right oöphorocystectomy and an appendectomy. This patient is living to-day, her third year terminating in a few months.

Gastroenterostomy for duodenal ulcer was done in two cases. A gastrotomy for ulcer on the posterior wall of the stomach was done in one case. In one case there was gastric carcinoma. In ten cases there were uterine and ovarian operations not requiring hysterectomy. In one of these there was a large cyst with a pedicle twisted several times. In seventeen of the cases the operation was associated with hysterectomy for fibroids. I have found the gall-bladder involved frequently in recent years in this condition, and, in my opinion, the patient's convalescence is scarcely retarded by these associated operations that are indicated. In six of the cases there was an acute pancreatitis in the hemorrhagic, suppurative or sloughing stages of the disease. Five of these recovered. In all of them a cholecystostomy had been done. One, previously cited, was operated on recently, doing a cholecystectomy. In one there was a mucous fistula which persisted for two years and then healed spontaneously.

Carcinoma of the papilla of Vater was observed once. This patient was operated on twice, first a cholecystostomy and subsequently a cholecystenterostomy being done. This patient has also been shown at a meeting of the Surgical Society.

Perforated Typhoid Cholecystitis.—In one of the cases, a male, during the third or fourth week of his attack of typhoid fever, had a sudden onset of acute abdominal pain, with distention. When I saw him on the following day, he was comatose, and a rapid exploratory operation for suspected perforation of the bowel revealed two large holes in the gall-bladder, with profuse peritoneal soiling with purulent bile-stained material. The wound was rapidly drained and packed and the patient was returned to bed in eleven minutes, quite moribund. He was unconscious for seven weeks, but finally recovered.

In February, 1903, I presented the subject of primary typhoidal

perforations of the gall-bladder at a meeting of the Surgical Society, recording the history of a female patient, forty-six years old, with a successful outcome. In my article at that time I recorded the then available statistics of this complication of typhoid, and found that, my own case included, there were thirty-four cases in all, and that of these four had recovered.

Hydatids.—Two patients with this complication have been operated on by me in the past two years. In one, where I did a cholecystectomy and choledochostomy, the hydatid was about the size of a hen's egg. It was located in the liver at the sulcus of the suspensory ligament and was easily excised intact, with secondary suture of the liver. My second case of hydatids will be recorded under the fatal cases.

I have had one case of acute phthisis associated with cholecystitis gangrenosa. In this I did a successful cholecystectomy, but within less than one year jaundice occurred and colic recurred. A further operation was then deemed inadvisable. This was some eight months ago, and I have not seen the patient since.

Hemolytic Jaundice.—This patient was a young man of twenty upon whom I did a cholecystostomy for suspected cholecystitis, followed in six months by a splenectomy. The latter operation was done about eight months ago, with entirely satisfactory results.

A subphrenic abscess occurred in six of my series, with one death. This fatal case is the same one recorded under complicating hydatids.

Transduodenal Operation.—This operation has been done by me three times in my career, successfully in each instance. With the advent of the Blake forceps, I feel the necessity of this procedure has been passed, as with the ordinary choledochostomy opening we can, with this instrument, grasp and remove with or without crushing, all stones, even when well impacted in the papilla of Vater.

Morbidity and Secondary Operations.—These questions cannot be reported definitely until some clearing-house method is established of reporting to the original operator the patient's condition and the necessity for further operations, etc. When some such method is employed, data of value to all, particularly to the prospective patient, can be advanced.

Deaths.—In 1910, out of a series of forty-three of these cases, no deaths occurred.

In 1911 there were fifty-four operations, with four deaths. The first of these was a widow of fifty with general streptococcemia. A cholecystostomy was done in the hope that some benefit might follow, particularly as the patient was slightly jaundiced. Death

resulted from a septic endocarditis, the patient surviving the operation by several days. It is possible, indeed, more than likely, that in this instance an unnecessary operation was done, but it is not probable that it hastened the patient's death.

The second death in the series was that of a Polish Jewess, well advanced in years and enormously fat, with double inguinal and an umbilical hernia, all of large size. She came under my care with a general peritonitis, her illness dating back about ten days. A fairly clear gall-bladder history was obtained. Operation revealed a large perforation in the gall-bladder, with pus and bile free in the peritoneal cavity. This patient was apparently on the road to recovery when a fatal pneumonia supervened.

The third case was one of acute hemorrhagic pancreatitis in a man, fifty-five years old, with an illness of ten days' duration. He was moribund when a cholecystotomy was done and many stones removed. Death occurred within thirty-six hours.

The fourth case was that of a man over sixty, upon whom a choledochostomy and cholecystotomy were done. Death followed on the seventh day from embolism, while he was engaged in a fierce argument with his son, a physician, about the necessity of continuing his special nurses.

In 1912 there were sixty-three recorded operations, without a death. In 1913 there were seventy-eight recorded operations, with six deaths, two of them after cholecystostomy.

The first case was that of a man, thirty-eight years old, who had dilated veins and varicosities to such a degree that merely rubbing the exposed mucous surface of the gall-bladder would be followed by a profuse hemorrhage. The veins in the vicinity of the pylorus and stomach were three-quarters of an inch in diameter. Death occurred on the fourth day, and was attributed to acute gastric dilatation.

The second case of this series was that of a man, fifty-five years old, with cardiac myositis, which proved fatal. In this case the operation showed a perforated gall-bladder, with a mural abscess containing air.

The third case was that of a woman of sixty where death followed a choledochostomy done erroneously for supposed duct obstruction which proved, upon microscopical examination of the autopsy specimens, to be a cell destruction by interstitial hepatitis. This patient had been operated on by me some three years before for a profound streptococcus cholangitis. A cholecystectomy and choledochostomy were done, with a stormy convalescence and prolonged drainage, followed by a condition of health far better than she had

enjoyed for fifteen years. After three years she had a sudden recurrence of her jaundice, and at the second operation the bile flowed perfectly clear and in fair quantity. While apparently progressing favorably, an acute nephritis supervened upon a chronic renal impairment, with fatal result.

The fourth case was that of a man, fifty-five years old, with a suppurative cholecystitis, a pericystic abscess, empyema, and a suppurative hydatid cyst. This patient had suffered from jaundice, with an intermittent temperature, for seventeen days, and was much emaciated. Operation revealed a perforated gall-bladder, with two well-localized abscesses, one on each side of the gall-bladder. Owing to the patient's serious condition, drainage only was done. Several days later, as the temperature still remained high, an exploratory aspiration of the chest was made and 8 ounces of purulent fluid withdrawn. The following day a section of rib was made and a few ounces of murky fluid evacuated. It was then seen that what had been regarded as a typical empyema was a lesion involving the dome of the liver, and upon puncture, over a quart of hydatids in most foul colon communis pus was evacuated. Death followed from exhaustion about two weeks after the operation.

The fifth and sixth cases, one a man fifty-five years old, and the other a woman of seventy-four, both died of nephritis, the first after a cholecystectomy, and the second after a cholecystostomy.

In 1914, up to April 10, there is a series of twenty-six cases, with three deaths. The first was that of a woman with well-advanced symptoms who died from nephritis after a cholecystectomy. The other two patients were males, aged fifty-five and fifty-seven years, respectively. The first was much emaciated and deeply jaundiced, with skin the color of mahogany. A choledochostomy was done and the patient died four days later from embolism. The second patient had already been operated on for prostatic enlargement and his urine contained the bacillus coli communis. There was an intermittent temperature of the Charcot type. A cholecystectomy and choledochostomy were done, showing evidence of a pure streptococcus infection. The patient's temperature dropped from 103.6° to 99°, he developed a generalized maculopapular eruption (septic infarcts) and died on the eighth day.

With the citation of the fetal cases, as given above, I cannot feel that I have been responsible for a single death by doing any additional operative procedure, as it will be observed that of the thirteen deaths, but two of these patients had any complicating disease. Of the thirteen deaths, eight were in males. The fourth death in 1911

was the result of pancreatitis, and was reported as such in a paper on pancreatitis published during the present year in the "*New York Medical Journal.*" The other, the fourth case that died in 1912, required the operations to which he was subjected, excepting the one for supposed empyema, as I am satisfied that my exploring needle must have tapped his hydatid abscess. Nevertheless, the suppurating hydatids were best approached through the transpleural route.

As a conclusion based upon these statistics, I am inclined to perform cholecystectomy more frequently than heretofore.

Two Step Operation.—This is a rarity with me, in fact, has only been considered in several instances when a rapid cholecystostomy for gangrene, etc., was indicated.

These cases in many instances resolve thoroughly and do not invariably return for further operation. Several instances of this type can be cited—one in particular, a sea captain, seventy-four years old, with a history of recurring attacks of gall-bladder colic, was seen by me through the courtesy of Dr. Walser, of Staten Island. At this time he gave a history of acute cholecystitis of some ten days' duration. The signs and symptoms, when seen by me, were those of gangrene with possible perforation. The patient's condition was such that a hurry operation only was feasible. The abdomen was opened, with findings of a gangrenous and perforated gall-bladder filled with calculi. The escaping, purulent bile was limited by omental adhesions. A large tube and iodoform drainage was installed. The patient, during delirium, evidently due to a deficiency in his urinary output, jumped from the second story window of the hospital, alighting upon his heels and fracturing both os calces. Upon returning him to his room, he was free from delirium, remained so and made a perfect recovery both of his gall-bladder involvement and the fractures. He finally died some four years later of pneumonia.

This citation is no argument that these patients all recover, as had he been a young man, his expectancy of life would have been far greater and recurrence of gall-bladder symptoms might have been observed.

I do not believe in the two step operation as advocated by many, but would heartily indorse it in those instances when a primary operation in the ultra serious patients is done for drainage, realizing that obstruction is present or still exists, as in the case of a physician in Bridgeport whom I recently operated upon.

When first called to see him on a Sunday afternoon, his condition was found to be very grave, due, in all probability, to a cholecystitis gangrenosa, giving at the same time a set of symptoms indicative of

common duct stone or pancreatic obstruction. Upon opening the abdomen, a large, distended, acutely thickened gall-bladder was exposed, with profound involvement of his pancreas. It was deemed advisable to drain the gall-bladder only and defer secondary operation to some later day, as it was suspected that the pancreas might be malignant. This was done, with a prompt recovery and closure of the cholecystostomy wound. In view of his recovery and gain the malignant suspicion became doubtful, when suddenly he reported a profound attack of pain and jaundice. Such attacks occurred several times, and he then concluded that he was ready for his second operation. This was done some five or six months after the first. The findings were highly pleasing, although difficult to remove, owing to the adhesions from the previous attacks and operation. The pancreas had resumed normal size and a single stone was found in the common duct. The appendix also was removed. He has made a most satisfactory recovery, gaining quite a number of pounds during the year now passed since his operation.

Such a procedure has been carried out by me in several cases—one of them being another physician in whom, at the second operation, I did a successful transduodenal operation.

Obstruction Due to Gall-stones.—I have operated five times for this condition—four of the patients unfortunately so far gone (fecal vomiting, etc.) at the time of operation, that recovery was impossible. The fifth, a widow, seventy-four years of age, with a clear history of repeated attacks of gall-stone colic, in whom an acute attack—suspected of being appendicular—was observed by several physicians. When I saw her, she was so tender in the right iliac zone as to mislead me into diagnosticating a gangrenous appendix. Operation was done under great difficulties at 1 A. M., an acetylene lamp from an automobile being the improvised light—an assistant, with an infected hand, giving ether; myself and a green nurse doing the operating in a ponderously fat old lady. The incision through the peritoneum was followed by a coil of ileum popping into the wound; the coil was felt to contain a large hard substance, obstructing the ileum about four inches from the ileocecal valve. In addition it was observed by the palpating fingers that there was a tumor of the right ovary, the size of a large lemon, and the suspected appendix was but a chronic one, quite large and adherent. The gall-bladder was not palpated, owing to her grave condition. A rapid enterostomy, with extraction of a stone the size of a large walnut, was done, the ovarian tumor and appendix were removed, and a drain was placed in the peritoneal cavity for forty-eight hours. A speedy recovery was effected.

About two years later she again suffered an attack of gall-bladder colic, which rapidly subsided. She has now gone by her seventy-seventh year, and for over one year no further trouble with the gall-bladder has been evident.

Trauma.—I cannot close this discussion without citing the history of a patient upon whom I operated recently, bearing upon trauma as a factor with a distinct medicolegal aspect.

The patient, a young man, was brought to me with the history of being struck, a few days before, in the upper right abdomen by a kickback from a piece of wood that he was sawing with a circular saw in the factory of his employer. His condition was such that no careful history of his previous condition was taken. An operation for cholecystitis or possible rupture of the gall-bladder was done; a gall-bladder with cloudy bile was opened—the terminal fluid being milky white. Pathological examination failed to reveal pus organisms, but clinically the patient evidenced a typhoid chart and, upon examining him for typhoid, Widal was found positive. The patient was, or is now, in the hands of his attorney, trying to prove trauma as the cause of his cholecystitis, while we in a more careful history have obtained the facts that he was ailing for quite some time before he was struck by the piece of wood.

A work about the *x*-ray diagnosis: Recently Pfahler, of Philadelphia, in the *Journal of the American Medical Association*, states that although "He had 74 per cent. definite evidences of stones by the *x*-ray, he felt that 50 per cent. in the hands of himself and other radiologists would be a fair average. That to show gall-stones, the greatest care and repeated exposures are necessary. Also that lime salts must be present with cholesterin, etc., to show a shadow."

ANASTOMOSIS OF THE GALL-BLADDER TO THE STOMACH: "CHOLECYSTOGASTROSTOMY."

BY

JULIUS H. JACOBSON, M. D., F. A. C. S.,

Toledo, Ohio.

THE anastomosis of the gall-bladder to the stomach or the formation of a gastrobiliary fistula is an operation which has not received sufficient consideration. The operation has been variously called "biliary gastrostomy," "cholecystogastric anastomosis," "gastrobiliary anastomosis," "cystogastrostomy," "gastrocholocystostomy," "cholecystogastrostomy." The latter term seems to be the preferable one.

The indications for the performance of this operation are the same as for cholecystenterostomy, namely, chronic obstructions of the common duct. On first thought it would seem that this operation is not a rational one as the presence of bile in the stomach might be injurious to digestion, therefore the operation would not be based on sound physiologic principles. A careful consideration of the experimental and clinical evidence which may be found in the literature pertaining to the operation will convince one that the operation is not only rational but that it possesses certain advantages over all other methods of anastomosing the gall-bladder to the alimentary tract. In our text-books on surgery we learn that the gall-bladder can be anastomosed to the duodenum, jejunum, ileum, and colon.

The classical operation of cholecystenterostomy is the anastomosis of the gall-bladder to the duodenum for the reason that it so nearly reproduces the normal situation for the entrance of bile into the intestinal tract. This classical operation is often difficult to perform on account of the immobility of the duodenum. There is also danger of leakage of pancreatic secretion when the union is not perfectly made, a most distressing accident when it occurs. On account of the difficulty of anastomosing the gall-bladder to the duodenum and because such operations must be performed on greatly debilitated patients, the primary mortality of cholecystenterostomy is necessarily high. While the anastomosis between the gall-bladder and the jejunum or ileum is not so difficult to perform

as compared with the classical operation, it is not, strictly speaking, an anatomical operation, and the danger of ascending infection is greater. This operation is not so easy of performance as the anastomosis between the gall-bladder and stomach. Owing to the great danger of infection, the anastomosis between the gall-bladder and colon is the least desirable and should be abandoned.

In speaking of the mortality for cholecystenterostomy, Brewer(1) does not think the operation justifiable for cancer of the pancreas or common duct. He agrees with Moynihan who says that cholecystenterostomy is a dangerous operation, its mortality being about 75 per cent. which makes it prohibitive. He is inclined to believe that all such cases should be left alone. This opinion is, in all probability, correct, but must give way to the lessened mortality rate following the anastomosis of the gall-bladder and stomach in such cases.

The chief diseases which require such operative relief on account of the obstruction to the common duct and subsequent jaundice which they produce, are cancer of the common duct; cancer of the head of the pancreas; chronic interstitial pancreatitis and in cases of obliteration of the common duct from severe infection from cholelithiasis. In all of these conditions the general condition of the patient is, as a rule, very bad and the operative procedure to be employed must be a short one. As the gall-bladder lies normally in close proximity with the pyloric end of the stomach, and as this portion of the stomach is, as a rule, mobile, an anastomotic operation between these organs is obviously easy to perform.

The first operation of this kind to be performed was made by two Vienna surgeons, Max Wickhoff and Franz Angelberger(2) Sept. 21, 1892. The patient was a female, aged forty-five, suffering with cholelithiasis with chronic obstruction of the common duct. The anastomosis was made between the gall-bladder and the lesser curvature of the stomach. Patient made a perfect recovery.

There is abundant experimental evidence to show that the presence of bile in the stomach is not only not injurious to digestion, but causes no discomfort whatsoever. As early as 1887, Oddi(3) introduced bile into the stomach under various conditions and studied the results; among other experiments he made cholecystogastric fistula. He concluded that the presence of bile in the stomach before and during that period of digestion in no wise diminishes the power of the gastric juices. He demonstrated the presence of bile in the ventricle of the stomach during advanced digestion, with the peptones not precipitated.

Oddi stated that the opinion of the majority of physicians and physiologists who believe that the bile may give rise to grave disturbances of the stomach and vomiting, is not correct. Oddi also was of the opinion that a cholecystogastric fistula may probably be applied more advantageously in certain affections of the bile passages than the cholecystointestinal fistula.

Cannac(4) in 1897, reporting his experiments of cholecystogastric fistula on seven dogs, stated that the animals suffered no inconveniences from the entrance of bile into the stomach. He goes so far as to state that gastrocystostomy should be given the preference in every case where cholecystenterostomy is indicated.

Masse(5) in 1898, relates that cholecystogastrostomy was found very successful in animal experiments at the laboratory for operative medicine at Bordeaux, when used upon dogs. The digestive function remained normal. In most of the animals experimented upon, a ligature around the choledochus along its middle portion was applied, and the gall-bladder anastomosed to the stomach. Cannac also practised this double operation in a number of animals in October, 1897. Several dogs operated by Cannac in October were submitted to autopsy in June and July following. Occlusion of the choledochus was found to be complete and the fistula between the gall-bladder and stomach permeable. These results obtained in dogs led Cannac to recommend the introduction of this operation upon man in case of absolute obstruction of the choledochus.

Mocquot(6),(7) made experiments with anastomoses between the bile passages, stomach, duodenum, and jejunum. His experiments were conducted on dogs which were allowed to live and after a long period of time autopsied. Mocquot's conclusions were as follows: The danger of infection of the gall-bladder is not very great, especially when the anastomotic opening is made small and exact so that no ulcer occurs at the anastomotic site. He found bacteria in the gall-bladder and in the liver itself. In two instances the liver showed changes which resembled biliary cirrhosis. In the case where the gall-bladder was anastomosed into the stomach, these changes were not so marked as in the case where the communication was made between the gall-bladder and jejunum. "It seems that the introduction of bile into the stomach has caused no disturbances of gastric secretion, and my experiences," says the writer, "are in accord with those of Dastre." Neither dog shows any biliary infection. He observed one dog that had been killed six months after cholecystoduodenal anastomosis and found him in perfect health and no signs of ascending infection of the biliary passages. Masse and also

Radviewski did cystogastrostomy on dogs and noted no biliary infection, but more recently Hubicki and Szerszynski (*Gaz. Lebarsk.*, v, 30, Oct. 8, 1910) reported results in seven dogs in which cholecystenterostomies were done and found heavy infection of the biliary passages and liver in four. Their results confirm those obtained by Bozzi. Mocquot believes that cystogastrostomy is less liable to cause biliary infection than cystenterostomy, and prefers the former operation. In 1912 George Milton Smith(8) studied the changes in the gall-bladder following autoplastic transplantation into the gastrointestinal tract. Smith's conclusions were as follows:

1. Autoplastic transplantation of the tissues of the gall-bladder into the gastrointestinal tract is followed by definite histological changes as a result of adaptation of the transplanted tissue to new environment.

2. Gall-bladder tissue transplanted into the gastrointestinal tract undergoes hypertrophy of the mucosa with development of new lymphoid tissue. When transplanted into the stomach, the hypertrophy of gall-bladder mucosa may become especially marked, and be associated wth active proliferation and degeneration of the transplanted cells with mucous production.

3. The increase in lymphoid tissue developed in the gall-bladder transplanted to the surface of the intestinal tract, whereas a considerable decrease of lymphoid tissue occurs in gall-bladder transplanted into the sterile peritoneal cavity, affords evidence that the development of lymphoid tissue is in response to bacterial environment and possibly to other chemical or mechanical causes injurious to the tissue.

4. There is no experimental evidence that a metaplasia occurs in gall-bladder tissues in fistulous communication with the intestinal tract, such as has been described as taking place in the human gall-bladder under similar conditions.

In 1914 Wiedeman(9) made animal experiments to determine the effect on digestion of the abnormal entry of bile in the gastrointestinal tract. His experiments consisted in making anastomoses between the gall-bladder and the stomach and also the small intestine near the boundary of the jejunum and the ileum. His conclusions were that even in the presence of large quantities of bile in the stomach contents, in no instance was the acidity of the stomach lessened. Immediately after the experiment the motility of the stomach was not affected, although at a later period the motility was influenced. The intestinal digestion suffered no changes when the bile was diverted into the stomach. The author came to the

conclusion that changes in digestion were greater when the gall-bladder was anastomosed to the small bowel.

The clinical evidences of the bile being well tolerated in the stomach and not affecting digestion, we find not only in the recorded cases of gastrocholecystostomy, but in the everyday operation of gastrojejunostomy for ulcer of the stomach. It is well known that more or less bile enters the stomach after the latter operation.

Monod(10) in 1896 probably made the second operation of gastrocholecystostomy. The patient, a male aged fifty-five, was suffering from icterus due to an obstruction of the choledochus. Exploratory laparotomy, no stones found. Cholecystogastrostomy with a Murphy button was performed. The patient died next day. Autopsy revealed cancer of the pancreas.

Terrier(11), in 1896, reported that he had performed a gastrocystostomy in December, 1895. The patient was suffering from chronic icterus due to a neoplasm of the head of the pancreas and degeneration of the neighboring glands. Patient died ten months later.

Jaboulay(12), in 1898, recommended cystogastrostomy as the operation of choice in permanent obstruction of the choledochus whenever a tumor complicates the condition. He reports a case of a male, aged forty-six, with icterus for five months; tumor; cancer of pancreas; cholecystogastrostomy, with recovery. The patient did not vomit bile after operation. The icterus rapidly diminished and gave evidence that the bile was circulating in the bowel again, urine became clear in eight days, and the stools became colored.

Montagnon and Duchamp(13) report a case of cystogastrostomy. The patient was a male, aged fifty-five, with icterus for about five months; suspected neoplasm of choledochus; operation April 5, 1899. Small neoplasm of head of pancreas; gall-bladder was dilated; no stones; cystogastrostomy; good recovery. The anastomosis of the gall-bladder to the pyloric end of the stomach gave rise to no digestive disturbances, no vomiting, etc.

Ferd Krumm (14) in 1901 reported a case of chronic choledochus occlusion in which he performed cystogastrostomy. The patient died seven weeks later. The autopsy showed a complete occlusion of the ductus choledochus due to a tumor of the head of the pancreas. Gall-bladder found free and anastomosing with stomach. Cancer metastases involved other organs.

Perrin(15) in 1902 in an extensive thesis on cholecystogastrostomy for irremediable obstruction of the choledochus deals with the operation, its history and indications in great detail. He reports a series of fourteen cases collected from the literature up to that time (see

Table). He states that this operation was performed rarely prior to and including 1898; three times it was done in 1899; four times in 1900. This progress is largely due to the experimental work done by Masse and Cannac. To these authors is due the credit of placing cystogastrostomy on a rational scientific basis and making it known.

In his conclusions he states that permanent occlusion of the choledochus is often difficult to diagnose without exploratory operation. Cholecystoduodenostomy seems to be rather easy of accomplishment when no malignant growths are in the vicinity. But in the difficult cases where neoplasms exist cholecystogastrostomy is to be preferred. It is an easy, rapid, scientific, and rational operation, both anatomically physiologically and functionally. The diversion of the bile into the stomach does not produce any digestive disturbances. Perrin thinks this has been proven by Dastre, Oddi, Masse and Cannac, and in the fourteen observations compiled in his thesis, as well as in the many cases of spontaneous cholecystogastric fistulas found at autopsy.

Perrin concludes that cholecystogastrostomy is, therefore, a permissible operation and becomes the operation of choice when cholecystoduodenostomy is difficult or contraindicated.

Cernezzi(16) reports a case of a female, aged sixty-four, with chronic jaundice; operation was performed with aim of doing a cholecystenterostomy. When this was attempted he found it impossible on account of adhesions, he then performed a gastrostomy with good results. Operation December 3, 1905.

De Francesco(17) reports a case of a male, aged fifty; with suspected cancer of the head of the pancreas; exploratory incision showed the head of the pancreas hardened, but not greatly enlarged. The choledochus did not contain gall-stones, but the gall-bladder was distended; cholecystogastrostomy with pyloric end of stomach was performed; recovery followed.

Wm. Eichmeyer(18) from the clinic of Prof. Hans Kehr at Halberstadt, reports brief histories of twelve cases of gastrocystostomy. He states that anastomoses between the biliary system and intestinal tract were made during the past three years in twenty-two cases. In thirteen cases a communication of the gall-bladder with the gastrointestinal canal was effected. Kehr has repeatedly called attention to the fact that he prefers anastomosis of the gall-bladder with the pyloric end of the stomach, to that with duodenum and especially the ileum, jejunum, or even transverse colon. Although others consider this method as the "most impractical," he points to their cases of cystogastrostomy (about forty cases) which showed neither

biliary vomiting, nor loss of appetite or other complaints as the result of bile flowing into the stomach. The advantages of this method, according to Kehr, lies in the fact that the pyloric end of the stomach in the majority of cases is readily approximated to the gall-bladder and the suture is easily and accurately made on account of the thicker wall of the stomach. Mayo Robson's preference for anastomosis between gall-bladder and transverse colon is frowned upon by Kehr as the bile here is effective only in the terminal end of the bowel and besides there is great danger of infection.

In his recent communication Kehr(20) states that he has performed cystogastrostomy sixty-two times and again emphasizes the best of all anastomotic operations because it is the easiest to perform and is rarely followed by severe ascending infection. Kehr has not as yet published the details of these operations.

To the above recorded cases, the author desires to add the following case report:

Mr. C. Y., male, aged sixty-four, admitted to St. Vincent's Hospital April 10, 1914, referred by Drs. Brailey of Swanton, Ohio, and Dr. Ingrahan, of Curtice, Ohio. Farmer by occupation.

Family History.—Father died of causes unknown. Mother living and well at eighty-five.

Previous History.—Muscular rheumatism(?) in right leg and thigh. At twenty years of age, two attacks of fever. In bed three to five weeks.

Present Illness.—Began about two years ago. On January 15, 1914, consulted a physician for severe constipation and painful feeling in right side of abdomen. Has been jaundiced for the past two months. Pain has not been severe at any time, although present for past four weeks. At present time bowels move easily. Abdominal distention is present nearly all the time. Has lost about 30 pounds in weight.

Status Presens.—General appearance of patient is that of being very ill. Nutrition fair. Abdomen, liver palpable; three finger breadths below costal arch the gall-bladder is enlarged.

Diagnosis.—Secondary carcinoma of liver and bile ducts. Dilated gall-bladder due to obstruction of common duct. Primary carcinoma of colon(?). An anastomosis of gall-bladder to stomach was advised for palliative purposes to relieve the severe jaundice.

Operation.—St. Vincent's Hospital, April 11, 1914. Right rectus incision; patient placed in elevated gall-bladder position. Cecum ascending and transverse colon adherent to each other and the tip of the appendix intimately attached to the tranverse colon. The gall-bladder was found to be greatly distended, containing no stones nor were there any stones palpable in the ducts. The head of the pancreas was very much enlarged. No enlarged glands. The cecum was brought up into the incision and in freeing the appendix from the transverse colon, a small hole was torn in large bowel. The

No.	Operator	Date	Pathology	Result	1902
1	Wickhoff and Angelberger.	Sept. 2. 1892.	Cholelithiasis.....	Recovery.....	Reported by Perrin.
2	Terrier.....	Dec. 19, 1895.	Cancer of pancreas.	Lived 10 months.	Reported by Perrin.
3	C. Monod....	June 1, 1896.	Cancer of pancreas.	Died.....	Reported by Perrin.
4	Lejahrs.....	Oct. 20, 1896.	Cancer of pancreas.	Died.....	Reported by Perrin.
5	Quenu.....	April, 1897.	Cancer of pancreas.	Lived 3 months.	Reported by Perrin.
6	Giordano.....	May 6, 1897.	Sclerosis of pancreas.	Died.....	Reported by Perrin.
7	Jaboulay.....	Dec. 18, 1899.	Cancer of pancreas.	Lived 14 months.	Reported by Perrin.
8	Duchamp....	April 5, 1899.	Cholelithiasis.....	Lived 13 months.	Reported by Perrin.
9	Picque.....	June 28, 1899.	Cancer of pancreas.	Lived 11 months.	Reported by Perrin.
10	Jaboulay.....	Dec. 18, 1899.	Cancer of pancreas.	Lived 4 months.	Reported by Perrin.
11	Lejahrs.....	Feb. 4, 1900.	Cancer of pancreas.	Died.....	Reported by Perrin.
12	Jaboulay.....	Aug. 30, 1900.	Cancer of pancreas.	Lived 4 months.	Reported by Perrin.
13	Moynihan....	1901.	Rupture of intestines at duodenojejunal flexure.	Recovery.....	.....
14	DeFrancesco Donato.	1906.	Cancer of pancreas. (?)	Recovery.....	Reported by Perrin.
15	Ferd Krumm.	1901.	Cancer of head of pancreas.	Lived 7 weeks...	Reported by Perrin.
16	Cernezzi (16).	Dec. 3, 1905.	Chronic jaundice adhesions about ducts.	Recovery.....	.....
17	Jacobson.....	April 10, 1914.	Chronic intestinal pancreatitis. Severe jaundice.	Complete recovery.	.....

Prof. Hans Kehr(20) (p. 620) states that he has performed the operation of cystogastrostomy sixty-two times. No details given.

hole was closed and the appendix ligated and removed in the usual manner. Pylorus and stomach normal free. The gall-bladder was aspirated after pulling over the pylorus and walling off the abdominal cavity. Very dark thick bile evacuated. Fundus of gall-bladder sutured to the stomach serosa with interrupted No. oo chromic catgut. Pylorus was then opened and the usual form of anastomosis made, using No. oo chromic catgut sutures. Abdominal closure. Patient made an uninterrupted recovery. Healing of the wound was primary. On account of the debilitation of the patient, he was not discharged from the hospital before the twentieth day. Jaundice disappeared completely in about three weeks. A recent examination (September 10, 1914) reveals the patient in a normal state of health. At no time has he suffered any apparent inconvenience from the presence of bile in the stomach.

In all there are seventy-nine recorded operations for cholecystogastrostomy in the literature, sixty-two of which have been performed by Prof. Hans Kehr of Berlin. The remaining seventeen cases detailed by various operators, show that eleven times the operation was performed for malignant disease of the pancreas, and six times for benign conditions. There were three immediate deaths following the operation for malignant disease. The eight patients who recovered lived for periods ranging from seven weeks to fourteen months after operation. In the six benign cases there was one death and five recoveries.

TECHNIC OF OPERATION.

After the abdomen has been opened the distended gall-bladder is thoroughly aspirated. The opening in the gall-bladder is then enlarged to about 3 cm. in diameter and a strip of gauze placed within the lumen to prevent further leakage of bile during the anastomosis. The pyloric end of the stomach can be readily pulled forward and a point just within the pyloric ring is selected for the incision into the stomach. Incision should be longitudinal about 3 cm. in length. The serosa of the stomach should be incised and sewn to the posterior margin of the gall-bladder by interrupted sutures before the stomach cavity is opened. After the incision of the mucous membrane of the stomach interrupted sutures unite it to the mucous membrane of the gall-bladder. The mucous membrane suture is now continued around the entire anastomosis. A final serosa suture completes the operation.

All suture material should be o or oo chromicized catgut. Kehr recommends covering the anastomosis with an omental graft. The abdomen is closed without drainage.

CONCLUSIONS.

1. The operation of cystogastrostomy has the same indication as that for cholecystenterostomy.

2. The presence of bile in the stomach after cystogastrostomy does not interfere with digestion or cause the patient any inconvenience.

3. The operation is very easy to perform, therefore it offers a palliation and prolongation of life to a class of patients which as a rule are considered inoperable.

4. On account of the small danger of ascending infection it should be the choice of methods when it becomes necessary to anastomose the gall-bladder to the alimentary tract.

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REPAIR AND RECONSTRUCTION OF THE BILE DUCTS.

BY

J. H. JACOBSON, M. D., F. A. C. S.,

Toledo, Ohio.

The problem of repairing, anastomosing, and reconstructing the large bile ducts may confront the surgeon in dealing with accidental injuries to the ducts from traumatism, during surgical operations on the gall-bladder and bile passages, from sloughing of the ducts from severe inflammation and infection in cases of stone in the common duct, from secondary cicatricial contraction causing stenosis of the common or hepatic ducts, in operations for resection of the ducts for carcinoma situated in any part of the common duct or head of the pancreas, and in congenital malformations, such as cystic disease of the common duct.

The operations necessary for the reconstruction or repair of the bile ducts may be as follows:

1. Simple suture of a wound in the duct.
2. End-to-end anastomosis of the ducts.
3. Plastic closure of a defect in the duct by omentum, part of the gall-bladder wall or stomach.
4. Hepaticoduodenostomy, or hepaticogastrostomy, the implantation of the hepatic duct into the duodenum or stomach.
5. Cholecystenterostomy when the gall-bladder is still present.
6. The formation of a new bile duct by transplanting pieces of veins, hardened arteries, or vermiform appendix.
7. The reconstruction of an entirely new duct, a so-called hepaticoduodenostomy with a rubber drain tube, after the method of Jenckel, Wilms, Sullivan and Verhoogen.

That the large bile ducts have remarkable powers of regeneration has been emphasized by Korte,(2) Kehr,(26) Nordman,(5) and others. Epithelialization of a biliary fistula following cholecystostomy, or choledocotomy is well known, and it is this peculiar and apparently special regenerative ability of the bile ducts which is utilized in the reconstruction of an old duct or for the formation of an entirely new one.

Owing to the increase in the number of cholecystectomy operations now being performed for cholelithiasis a consideration of the accidental injuries to the deeper ducts which have occurred

during such operations is of the greatest importance. Abdominal traumatisms, especially those about the upper abdomen have been known to cause rupture of the common or hepatic ducts. Uncomplicated rupture of the ducts is of the rarest occurrence, the injury being practically always associated with an injury to the gall-bladder or liver. Such injuries of the ducts are usually treated by simple drainage on account of the weakened condition of the patient at the time of operation. According the Thole(4), a primary suture of the common duct from abdominal traumatism has not as yet been reported. Spontaneous rupture of the ductus choledocus has been observed by Quinu and Rotier(4).

Both the common and hepatic ducts have been severed or partially resected during the removal of the gall-bladder. Such accidents have been reported by Korte(2), Kehr(26, 3, 7, 23, 26), Mayo (1), Doyen(11), Moynihan(22), Wilms(15, 16), and others.

Kehr(26) (p. 183) in his most recent work states that he has injured the common and hepatic ducts fifteen times in 1000 cholecystectomies, or in 1.5 per cent. of such operations. He repairs the injury by an end-to-end suture of three-fourths of the circumference of the ducts and drains the hepatic duct with a T-rubber drainage tube. All cases, with one exception, recovered. In the fatal case death was due to biliary cirrhosis and not to the injury to the duct.

According to Kehr(26) similar cases of accidental injury to the ducts have been reported by Korte, two cases, Delagemiere, Dahl, and Dobrucki, each one case.

The author's attention was called to the importance of this accident on account of the following case.

Mrs. J. B., aged fifty-nine. Admitted to St. Vincent's Hospital, Toledo, Ohio, December 23, 1913. Married. Occupation, housewife. Referred by Dr. C. F. Douglass, Kalida, Ohio.

Family History.—Patient has given birth to four children. One child died of tuberculosis at twenty years. Two died in infancy, and one son is living and well at twenty-five years. Patient had typhoid fever thirty years ago, was sick in bed three weeks. One year later had another similar illness, but not so severe. Hay fever every year for past twenty-eight years, consists of cold in fall and lasts until frost. Menopause was established six years ago.

Present Illness.—Began about twenty years ago with attacks of pain in upper abdomen. Bowels always very constipated for several days during attacks. Always complained of gas on stomach. Attacks gradually become more severe. Never jaundiced until April, 1913, during severe attack, jaundice lasting one week, was confined to bed two weeks, did not vomit, did not require a hypodermic. Last attack started October 25, 1913, pain very severe,

jaundice severe, in bed four weeks. Bowels very constipated. Examination of patient Nov. 20, 1913, elicited mass, size of goose egg, over the gall-bladder region, severe jaundice and clay-colored stools.

Patient's general condition and nutrition was fair. Former weight, 120. Present weight, 100. Pulse, 96. Temperature, 99° F. Respiration, 20. Heart, systolic murmurs at apex. Lungs, negative. Abdomen, tender over upper right abdomen. Rectus slightly rigid. Vaginal examination, negative. Urine negative, except increased amount of bile.

Diagnosis.—Cholelithiasis, Cholecystitis. Common duct stone.

Operation.—December 27, 1914; St. Vincent's Hospital, Toledo, Ohio. A right rectus incision was made, the patient being in the elevated gall-bladder position. After the removal of a chronically inflamed appendix through the gall-bladder incision, the gall-bladder was found to present all signs of a severe cholecystitis. The gall-bladder was contracted and hard, containing four stones, and one stone was also palpated in the common duct. The gall-bladder was dissected free from its attachment to the liver, beginning at the fundus and detaching it toward the cystic duct. A curved hemostatic clamp was then applied to the cystic duct and the gall-bladder amputated, the cystic artery was ligated and the common duct opened at its junction with the cystic duct and the stone was then removed from the common duct. At this point in the operation, it was noticed that what was considered to be the cystic duct, was really the severed end of the common duct. Examination of the gall-bladder specimen which had been removed showed about 1 inch of the hepatic duct, intimately attached to it indicating a parallel course of the cystic and hepatic ducts. The severed end of the hepatic duct was found as it emerged from the liver. An end-to-end anastomosis between the common and hepatic duct was made after the technic devised by Carrel for blood-vessel suture. Three interrupted tension sutures of 00 chromic catgut were applied and the circular running stitch of 00 chromic catgut completed the anastomosis. There was some difficulty in closing a very small portion of the anterior part of the duct. A small rubber drainage tube was carried down to the site of the anastomosis and a strip of iodoform gauze packed carefully around the duct. The abdomen was then closed. The patient withstood the operation very well, pulse 110 after its completion. The postoperative course was, uneventful until the fifth day when there was some discharge of bile through the drainage tube. This leakage of bile was undoubtedly due to the difficulty which was encountered in closing the anterior part of the anastomosis. The discharge of bile ceased on the seventeenth day, and the patient was discharged on the twenty-fifth day after operation. Recovery has been complete, patient remaining well up to the present time, ten months after the operation.

The accident in this case was unquestionably due to two factors, *first*, the parallel course of the cystic and hepatic ducts, and, secondly,

to the severe inflammatory changes about the gall-bladder and bile ducts. The prevalent conception of the anatomy of the cystic and hepatic ducts or rather regarding the junction of the cystic with the common duct is, that it takes place at right angles; this, however, is not the case in all instances as was shown by Ruge(34) before the German Surgical Congress in 1908. In his examination of forty-three specimens he found that the cystic duct entered the common duct at right angles fourteen times (32 per cent.); he found a parallel course of the cystic and hepatic duct in nine instances (20 per cent.), while a spiral course in which the cystic duct wound itself around the common duct was found sixteen times (37 per cent.). In reviewing the literature it was found that the injury to the deeper bile ducts was due to the atypical manner in which the cystic duct was joined with the common duct. Severe inflammatory changes were in most instances also present. In all I have been able to collect thirty-four cases as follows:

Tabulation of cases of injury to the hepatic or common ducts.

Kehr	18	Dahl	1
Wm. Mayo	1	Dobrucki	1
Noordman	1	Garre	1
Lanphear	1	Jacobson	1
I. S. Stone	1	Wilms	1
Doyen	1	Jenckel	1
Moynihan	1	Cholin	1
Körte	1	Wolff	1
Delagemiere	1		
		Total	34

Immediate results in thirty-three cases, thirty-one recoveries and two deaths.

Operative technic employed.

End-to-end anastomosis with circular suture with drainage of hepatic duct	21
End-to-end anastomosis with circular suture without drainage of hepatic duct	2
New duct formed from loop of small intestine	3
New duct formed by rubber tube	2
Hepaticocholangioduodenostomy	1
Cholecyscholedocostomy	1
Plastic closure	3
Not stated	1
	34

Although only thirty-four cases can be found in the literature with only two deaths following such a formidable injury, it is fair to assume that only the favorable cases have been reported and that they occur much more frequently than appears to be the case. This is also emphasized by the fact that in the hands of such an experienced surgeon as Prof. Hans Kehr of Berlin, the accident has occurred eighteen times.

Körte(2) reported a case of accidental division of the common bile duct during an operation for cholecystectomy. In this case the cystic duct was short and in clamping the lower end of the gall-bladder previous to its amputation both hepatic and common ducts were cut across. The divided ends of the duct were anastomosed by a circular catgut suture. Körte was the first to emphasize the importance of careful amputation of the gall-bladder to avoid injury of the bile ducts.

Wm. Mayo(1) states that in 1100 operations performed on the gall-bladder and bile passages at the Mayo clinic up to March, 1905, seven have involved complete loss of continuity of the common bile duct as a direct result of the operation. Five of these were intentionally produced in an attempt to remove a malignant neoplasm, one was accidentally caused and one followed an extensive operation for gall-stone disease. In the case of accidental injury of the common duct it was repaired by end-to-end suture of three-fourths of its circumference, leaving a gap anteriorly for drainage, as Mayo states he reproduced as nearly as possible the conditions of the duct which exist after incising it for the removal of stone.

Moynihan(11) reports a case of Doyen in which a portion of the common duct was removed with subsequent complete suture. In this case in extracting a stone from the common duct, the duct was torn through, the frayed ends of the duct were trimmed and the ends sutured over a rubber tube. Recovery followed.

Moynihan(22) also during an operation for cholecystectomy accidentally removed a portion of the hepatic duct. The defect was closed by an end-to-end suture over a catheter; with recovery.

Garre(17) reports a case of tearing of the hepatic duct which was repaired one and one-half years after the injury by an hepatocholangioduodenostomy. The patient well three and one-half years after. Garre chooses the left lobe of the liver for the anastomosis.

I. S. Stone(10) reports a case of complete division of the common duct following cholecystectomy. The gall-bladder was removed after clamping the ducts, the posterior margins of the ducts were firmly sutured together with catgut and a few stay sutures placed

TABULATION OF CASES OF INJURY TO THE COMMON AND HEPATIC DUCTS.

No.	Operator	Primary or secondary operation	Operative procedure. Pathology. Cause of accident	Operative technic	Result
1	Wm. Mayo (2)	Primary....	Accidental during operation of cholecystectomy.	Suture of posterior and lateral ends of the ducts, with drainage as in choledochotomy.	Recovery.
2	Körte(2)	Primary....	Accidental clamping of common duct during cholecystectomy.	Circular suture of duct with rubber tube drainage of the hepatic duct.	Recovery.
3	Kehr and Volkmar (3)	Secondary.	Accidental clamping of ducts during cholecystectomy.	End-to-end suture of ducts. Circular suture.	Recovery.
4	Dahl(4).....	Secondary.	Complete gall-bladder fistula following cholecystectomy.	New duct formed from loop of bowel, and entro-entro-anastomosis.	Recovery.
5	Noordman(5)..	Primary and secondary.	Division of hepatic duct during cholecystectomy.	Primary operation, an end-to-end suture of the duct. Later on account of stenosis. Transjejunal hepaticus drainage "par distance."	Recovery.
6	Emory Lanphear (9)	Secondary.	Severe inflammation of common duct and injury from dislodging a stone.	New bile duct formed from a loop of jejunum.	Recovery.
7	I. S. Stone (10)	Primary....	Accidental clamping of common duct during cholecystectomy.	Partial suture of severed ends with drainage of the duct.	Recovery.
8	Doyen(11)....	Primary....	Accidental division of the common duct during removal of a stone.	End-to-end anastomosis over rubber tube.	Death in ten days from cholemia.
9	Garre(17).....	Secondary.	Tearing of hepatic duct.	Hepaticocholangioduodenostomy. Anastomosis of left lobe of the liver with duodenum.	Recovery
10	Kehr(23).....	Secondary.	Accidental clamping of ducts during cholecystectomy.	Circular suture, end-to-end suture of ducts.	Recovery.
11	Moynihan (22)	Primary....	Accidental during cholecystectomy.	End-to-end suture over catheter.	Recovery.
12	Jenckel(25)....	Secondary.	Complete biliary fistula following cholecystectomy.	New duct formed with a rubber tube. Hepaticoduodenostomy.	Recovery.
13	Jacobson.....	Primary....	Accidental clamping of duct during cholecystectomy.	End-to-end suture of ducts. Circular suture.	Recovery.
14	Delagmiere. Quoted by Kehr (26)	Primary....	Accidental injury of ducts during cholecystectomy.	Details not given....	.....
15	Wilms(25).....	Secondary.	Accidental clamping of duct during cholecystectomy. Common duct ligated and accidentally resected.	New duct formed with rubber drain tube. Hepaticoduodenostomy.	Recovery.

TABULATION OF CASES OF INJURY TO THE COMMON AND HEPATIC DUCTS.—*Continued.*

No.	Operator	Primary or secondary operation.	Operative procedure. Pathology. Cause of accident	Operative technic	Result
16	Dobrucki(26)..	Primary....	Accidental clamping during cholecystectomy. Resection of hepatic duct.	Partial suture of the the duct with hepatic drainage.	Recovery.
17	Kehr(26).....	Primary....	Accidental clamping of hepatic duct.	Circular suture with hepaticus drainage.	Recovery.
18	Kehr(26).....	Primary....	Accidental clamping of hepatic duct.	Circular suture with hepaticus drainage.	Recovery.
19	Kehr(26).....	Primary....	Accidental clamping of hepatic duct.	Circular suture with hepaticus drainage.	Recovery.
20	Kehr(26).....	Primary....	Accidental clamping of hepatic duct.	Circular suture with hepaticus drainage.	Recovery.
21	Kehr(26).....	Primary....	Accidental clamping of hepatic duct.	Circular suture with hepaticus drainage.	Recovery.
29	Kehr(26).....	Primary....	Accidental clamping of duct during cholecystectomy.	Circular suture with hepaticus drainage.	Recovery.
30	Kehr(26).....	Primary....	Large incision in common duct for removal of stone.	Defect in common duct was closed by plastic operation using the part of the cystic duct for the closure.	Recovery.
31	Kehr(26).....	Primary....	Chronic obstruction of common duct by stone. Injury to duct.	Plastic closure of severed duct by utilizing part of gall-bladder wall.	Recovery.
32	Kehr(26).....	Primary....	Supposed cancer of gall-bladder. Cholecystectomy oval tear in common duct.	Plastic closure of defect in duct by a serous flap from stomach.	Died seven days after from pneumonia.
33	Cholin(29)....	Secondary.	Complete division of common duct.	New duct formed from loop of bowel.	Recovery.
34	Wolff(35).....	Primary....	Accidental division of the common duct.	Gall-bladder anastomosed to distal end of common duct.	Recovery.

Eight additional cases, details of which are not given by Kehr in which the hepatic duct was injured during cholecystectomy, on account of parallel course of the cystic and hepatic ducts. All recovered with circular suture.

about the severed ends of both ducts to hold them nearly in apposition without closing their lumen. Drainage was provided for, bile discharging for about ten days, patient making a complete recovery.

Noordman(5) in a very careful review of the literature upon this subject reports a case of accidental injury of the hepatic duct in which he made an end-to-end suture of three-fourths of the circumference of the hepatic and common ducts together with drainage so that two months later a secondary operation was necessary on account of a complete loss of bile through the fistula. Noordman made a transjejunal drainage of the hepatic duct by isolating the loop

of the jejunum with a lateral anastomosis of the two limbs of the loop and inserting a rubber drainage tube in the hepatic duct and running it into the isolated loop of the jejunum. The rubber tube was then brought out of the abdomen through another opening in the jejunum. In this manner a new bile duct was formed and recovery of the patient followed.

From a review of the foregoing it seems that an end-to-end suture of the common duct is followed by good results. That a complete closure of the ducts at the site of anastomosis is not only unnecessary but undesirable. Complete closure at the site of anastomosis may be followed by secondary stenosis of the duct. The better method is to make a three-fourths circular suture, leaving a sufficient opening for the insertion of a rubber drainage tube in the hepatic duct.

Noordman's case is unique inasmuch as the technic which he employed anastomosed the gall-bladder fistula itself with the jejunum. The case also illustrates the epithelilization of biliary fistulæ and what can be accomplished in forming a new bile duct in debilitated patients.

The operation of hepaticoduodenostomy can also be utilized for the reconstruction of the duct in cases of injury or after resection for tumors of the ducts. In this country Coffey(12) and Mayo(1) have each described the technic of this operation. Coffey's technic consists in cutting off the end of the duct obliquely and splitting it and then making an implantation into the bowel as in a Witzel fistula. Mayo(1) also emphasizes the importance of selecting the peritoneal-covered portion of the duodenum when the hepatic or common duct are to be implanted into the intestine.

Terrier(21) reports a case in which he made an implantation of the hepatic duct into the duodenum for cicatricial stenosis of the common duct. He also made the same operation in a case of pancreas tumor.

Wolff(35) reports a case in which for severe cholithiasis a cholecystostomy and choledocotomy with drainage of the hepatic duct was performed. In the following weeks after the operation, on account of the enormous quantity of bile which had escaped and the absence of bile in the stools, it was determined that the common duct had been accidentally divided. At the second operation, the lower end of the common bile duct was exposed and an anastomosis made between it and the gall-bladder; in other words, a cystocholedochostomy was made and the operation was followed by complete recovery of the patient.

Although transplantation of veins and even the appendix have

been recommended as substitutes for the common duct, there are no cases on record.

Danis(28) made some interesting experiments on the transplantations of pieces of veins to replace defects in the gall-bladder wall. He made these experiments in two dogs. Three months after the implantation, the transplants were found to be healed *in situ* without adhesions or visible scars. Macroscopically it could not be differentiated from the normal gall-bladder wall. Microscopic examination showed the transplants to be lined with normal mucosa and covered with serosa. The author came to the conclusion that the tissue of veins is peculiarly adapted to cover defects in the wall in the biliary passages.

Molineus(33) speaks of the possibility of replacing the defect in the common duct by the appendix. As the appendix has been used as a substitute for the urethra, Molineus thinks that this principle may also be applied for defects in the common duct. The author describes his technic which he has carried out on the cadaver.

The formation of the new bile duct with a loop of small bowel after the method of a Y-gastroenterostomy has been reported. According to Thole,(4) Kausch performed an operation in which he made first an enteroanastomosis, about 50 cm. below the ligament of Trietz, the loop of the bowel thus formed was divided and the proximal ends closed. The gall-bladder was anastomosed directly with the distal end. In this manner a new canal was formed between the gall-bladder and the intestine. In other words, a new common duct was formed. Montprofit performed virtually the same operation and reported it before the French Surgical Congress in 1908. Montprofit also reported that Dahl performed the same operation five months previously. Patient was suffering from a complete gall-bladder fistula, from accidental complete division of the common duct during an operation for cholecystectomy. Cholin also operated in this manner in 1909 for complete division of the common duct.

Emory Lanphear(9) reports two operations for total destruction of the gall ducts. One fatal and one successful. In the fatal case, the destruction was due to severe inflammation and infection of the gall-bladder and ducts. An opening was made on the upper aspect of the duodenum "to permit the bile to find its way into the gut after granulations should close the external wound." Bile, however, did not flow into the duodenum. Patient died on the fourteenth day of starvation, from leakage through the duodenum. In the second case a primary operation had been performed for stones in the gall-bladder and common duct. The stone in the common duct was pushed back

into the cystic duct, as the author states "By perhaps too much pressure." The stones in the gall-bladder were removed. Three months later, on account of severe sepsis and jaundice, a secondary operation was performed. An enormous abscess under the liver and sloughing of the gall-bladder were found. Nothing resembling the common duct could be seen. A third operation was performed two months later, on account of complete biliary fistula. The upper end of the hepatic duct was found, the jejunum was pulled into the incision and cut squarely across, the lower end being pulled out to the abdomen and the end to side anastomosis of the upper end was made about 12 inches from the cut jejunum. The free end of the jejunum was pulled through a hole in the transverse mesocolon and anastomosed directly by chromic catgut suture with the open hepatic duct.

The formation of an entirely new functionating common duct after the original duct has been destroyed, seems to have been actually accomplished by Sullivan and others. The method consists in making a communication between the remnant of the hepatic duct and the intestine with a rubber tube. The rubber drain tube lies free in the abdominal cavity or may be covered over by pieces of omentum. In this manner, the power of regeneration which the bile passages have by means of epithelialization is taken advantage of to form the new duct.

An interesting operation of this kind is described by Jenckel(25) who relates that in a patient on whom he had performed a cholecystectomy it was necessary eight and one-half months after the operation to operate again for a total complete biliary fistula; at the second operation the common duct and the lower part of the hepatic duct *was* obliterated. After opening up the biliary fistula and the lumen of the hepatic duct there was found a space of 8 cm. between the hepatic duct and the duodenum. Jenckel could only make a communication by placing a rubber tube into the hepatic duct and connecting it with the duodenum after the method of Witzel. The tube was allowed to remain for three weeks when it was removed and another one placed for eleven days longer. By this time through the epithelial proliferation of the intestinal mucous membrane as well as that from the hepatic duct, a new canal about the size of the index-finger was formed. His patient was alive and well four years after the operation.

A similar operation is recommended by Sullivan of Madison, Wisconsin (18), and performed by Brewer of New York(13) on a patient who had lost most of his common duct through suppuration

and gangrene following a cholecystectomy for a fulminating gangrenous cholecystitis. Brewer attempted to make a new common duct after the method of Sullivan by placing one end of a rubber tube in the hepatic duct and the other end in the duodenum and wrapping the intervening exposed portion with omentum. The immediate result was most satisfactory, bile being abundantly discharged into the intestine. Death occurred eventually from obliteration of the newly formed duct.

Wilms(15, 16) describes a method for the artificial formation of a common duct from a simple tube. The method consists in sewing one end of a tube into the hepatic duct and the other end into the duodenum after the method of Witzel. The middle portion of the tube lies free in the peritoneal cavity and is covered over with either the omentum or colon. The tube is allowed to remain and Wilms claims that it heals *in situ*. He was able to demonstrate this in two cases which had been operated eight months and four months respectively. He describes his animal experiments on the formation of such canals which proved that the new canal functionates for many months. The method should only be used in those cases where it is necessary for a rapid ending of the operation and where all other forms of anastomosis cannot be made.

Brand(25) reports six such operations performed by Wilms, three times the drain was carried into the duodenum, one into the upper part of the jejunal loop, and one into the stomach. Twice the drainage tube was vomited after remaining *in situ* two and four months and on one patient he was able to demonstrate function after one year. The two parts to be anastomosed should be brought together as closely as possible to favor the epithelialization and formation of the new canal.

Sullivan's(18) original experiments on dogs were made with a rubber tube leading from the hepatic duct into the duodenum. On the duodenal end of the drain tube a compressed sponge was placed and tied with catgut. When the catgut absorbs, the sponge enlarges and is supposed to pass down and out of the bowel. Sullivan recently described his method as follows: "One end of a rubber drain tube of about one-fourth inch in diameter is placed in the hepatic duct, the other end being passed into an opening in the duodenum or through the common duct. The tube is anchored *in situ* by several nonabsorbable ligatures, the tube being placed with the idea of keeping it there. The omentum is placed so as to cover over the exposed portion of the tube. In this manner a persistent sinus is formed which does not tend to contract. Microscopic sections show that "the mucosa

of the duodenum grows upward and the mucosa of the duct grows downward into the new formed canal and, furthermore, that the tissues comprising the walls of the artificial canal are formed peritoneal structures and not inflammatory deposits." In a recent personal communication Sullivan informs the writer of a successful case of reformation of the bile duct, with a rubber tube. Operation was performed one year ago, with recovery of the patient.

Sullivan states that in dogs if one sections the common duct and does not ligate either end, after a little biliary leakage the duct will reunite without suture, and will do so invariably.

Verhoogen(17) on account of cancer of bile ducts, resected the cystic, hepatic and common ducts. Between the stumps of hepatic and common ducts a space of about 6 cm. existed. A rubber drain was placed in the common duct and brought to the stump of the hepatic duct, where an opening was cut into the side of the tube, the tube being brought out of the abdominal incision. Tampon. Recovery.

Propping (32) reports two cases in which a T rubber tube was used to replace and bridge over defects in the common duct. In the first case there was an inflammatory stricture of the common duct following cholecystectomy. The stricture of the common duct was opened and the T tube placed in the ducts. This patient was examined two and one-half years later. At the third operation for another stenosis higher up in the ducts, a newly formed duct made by the T tube at the second operation was found patent and normal. In the second patient, Propping used a T tube and closed in the defect in the retroduodenal portion of the common duct. Although the patient died in twelve days from cholemic hemorrhage, the T tube was found to be functionating. Propping is of the opinion that a T tube should replace all other methods.

DeGraeuwe(6) reports a case of resection of the common duct for supposed carcinoma. The gall-bladder, cystic, and part of the hepatic and common ducts were removed. A distance of 6 cm. was found between the ends of the hepatic and common duct. An end-to-end suture was made. A new duct was formed by placing a rubber drain into the end of the common duct and running it upward to the stump of the hepatic duct where an opening in the side of the rubber was made. The end of the tube was then brought out through the abdominal incision. In this manner a new duct was formed and the patient was alive and well eleven months after the operation.

Voelcker(14) takes up the question of drainage of the bile ducts after plastic operations have been performed upon them. Drainage

is easily secured by a rubber tube from the hepatic duct into the bowel. The final disposition of the tube is uncertain. Voelcker recommends that the end of the tube be brought out through the wall of the duodenum through the abdominal wall. In this manner the drain can be removed in ten days, the duodenal fistula heals spontaneously. Voelcker reports two cases in which he used this method with success. He calls this method a transduodenal drainage of the hepatic duct.

Mann, of Minneapolis, (24) reports the use of a rubber tube to assist in the replacement of common bile duct which had been destroyed as the result of cicatricial contraction and obliteration of the common duct following severe infection and sloughing in gall-stones. Cholecystectomy was performed. On account of persistent jaundice, a later operation was performed and the obliterated common duct found. The stump of the hepatic duct was opened and a rubber drainage tube three-sixteenths of an inch was used to bridge a distance of 1 3/4 inches from the hepatic duct to the duodenum. This patient was alive and well five months after the operations. This case is unique as the rubber drainage tube was allowed to remain in place with the expectation that it would pass out through the intestinal canal.

In a recent communication from Doctor Mann the patient is reported as being fairly well when last seen (June 1, 1914). Patient has had a few attacks of discomfort with general malaise of moderate degree, and occasionally a slight yellowing of the skin. The rubber tube was never found. Doctor Mann is of the opinion that her attacks of discomfort are due to a mild infection ascending into the bile ducts from below.

Arnsperger and Kimura(19) from Wilm's clinic in Heidelberg, report their experiments upon animals for the artificial formation of the common duct with a simple drain tube. Their experiments were conducted upon dogs and cats, the tube passed through the intestinal track on an average of thirty-five days after the experiment. The danger of the method consists in leakage between the tube and the ducts, resulting in peritonitis, there is also a danger of cicatricial contraction of the duodenal opening. The authors are of the opinion that the method is safer in human beings.

Cahen(29) made an anastomosis between the hepatic ducts and the stomach following a previous operation in which a cholecystectomy and common duct drainage had been performed. At the second operation, complete cicatricial stenosis of the common duct was found. With a No. 17 Nélaton catheter, Cahen made a com-

munication between the hepatic duct and the stomach. The catheter was brought into the stomach after the method of Witzel. After four weeks the patient vomited the catheter. Healing eventually took place, the patient died three months after the operation. The autopsy showed an abscess of the liver, the new opening in the stomach had closed. The author came to the conclusion that such anastomoses between the bile ducts and the stomach functionate only as long as the drain remains. Cahen recommends the transhepatic drainage of the hepatic ducts to replace the transduodenal route. He thinks in this manner complete suture of the duct can always be accomplished.

Kramarenko(31) speaks of a method which he designates "cholecystenterostomy par distance." The method is that similar to that described by Wilms of forming a fistula between the gall-bladder and the duodenum with a drainage tube, an omental graft covers the tube. In this manner a new fistula is formed between the gall-bladder and the duodenum. The operation is indicated in certain cases of chronic stenosis of the common duct in which a simple cholecystostomy or an anastomosis between the gall-bladder and stomach or gall-bladder and intestine is indicated. He reports a case in which he made a cholecystostomy for common duct obstruction due to carcinoma of the head of the pancreas. After two months, on account of the cachexia, a jejunostomy was made, three days later a communication between the gall-bladder fistula and the jejunostomy opening was made, a glass tube was used for the communication. The bile flowed freely into the intestine and normal stools appeared the next day. Six and one-half months after the operation the patient was well and the new communication functionated perfectly. The author thinks that this method should be the method of choice in all cases of carcinoma of the head of the pancreas for the reason that the danger of infection is very small and in case that it occurs and the new communication can be easily divided if the tumor increase in size, the jejunal opening then being used for feeding.

Jackson(36) reports an operation for formation of the new bile duct by a rubber drain tube. In this case Jackson had previously made a partial gastrectomy for cancer in which a choledochotomy was also made on account of the danger of occlusion of the common duct by cicatrization about the pancreas. To cure the biliary fistula which followed a new duct was made by anastomosing the distal end of the hepatic duct to the jejunum, a so-called anterior choledojejunostomy. Patient was alive and well seven months after the

operation. The rubber tube was not recovered. Jackson also speaks of another similar operation for the formation of a new bile duct which he performed after removing the gall-bladder and ducts for carcinoma. This case terminated fatally.

The literature contains cases of new common ducts formed by the use of a rubber drain tube as follows:

Jenckel	1		Voelcker.....	2	
Brewer	1	Died	Mann.....	1	
Wilms	6		Jackson.....	2	1 death
Dreesman	1	Died	Cahen.....	1	
Verhoogen	1		Sullivan.....	1	
Propping	2	1 death	Kramarenko..	1	
DeGraauwe	1			4	deaths
				22	cases

CONCLUSIONS.

1. The possibility of accidental injury to the common and hepatic ducts must not be forgotten in every operation for the removal of the gall-bladder.

2. Such accidents arise owing to the atypical junction of the cystic with the hepatic and common ducts.

3. The larger bile ducts can be repaired either by simple suture or by end-to-end anastomosis. The anastomosis should allow for drainage for the hepatic ducts.

4. Portions of omentum, pieces of the gall-bladder and flaps from the stomach have been successfully employed to cover defects in the walls of the ducts.

5. When a sufficient portion of the hepatic duct remains it may be anastomosed into the stomach, duodenum, or small intestine after the method of Witzel.

6. A new common bile duct may be formed by transplanting a piece of small intestine for the purpose, and where possible this should be the method of choice.

7. Owing to the wonderful regenerative power of the bile ducts, a complete new duct can be formed by the aid of a rubber tube connecting the remains of the hepatic duct with the stomach, duodenum, or jejunum.

8. While the immediate results of this method are good, the ultimate results are not known, therefore the method should be used only in debilitated patients.

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REPORT OF CASE OF PYLORIC STENOSIS IN AN INFANT, OPERATED ON BY THE METHOD OF DR. JOHN W. KEEFE, PROVIDENCE, R. I.

BY

CHARLES L. BONIFIELD, M. D.,

Cincinnati, Ohio.

At the Toledo meeting of this Association, held in 1912, Dr. John W. Keefe, of Providence, R. I., read a most excellent paper on "Stenosis of the Pylorus in Infancy" in which he described an operation, for its relief, original with him. I was impressed with the simplicity of the procedure and determined if such a case should fall into my hands it should be the operation I would try.

In October, 1913, Dr. Wm. Gillespie asked me to see a case with him at Christ's Hospital. The baby was born September 25, and nothing unusual was noted until about the tenth day, when it began to vomit and they had great difficulty in getting the bowels moved. The baby was losing weight and was becoming very weak. It was brought to the hospital for better care and closer observation. Medication and alteration of diet and hours of feeding had absolutely no effect. I saw the case on October 29 and the distended stomach could easily be outlined through the emaciated abdominal wall. An olive-shaped tumor could be plainly felt in the region of the pylorus. Dr. Gillespie had already reached the conclusion that nothing short of an operation would save the child and I at once agreed with him.

The following morning, October 30, at Christ's Hospital the child was etherized and the usual incision made through the right rectus muscle. The pyloric end of the stomach was brought out through the incision and a longitudinal incision was made a little more than an inch from the pylorus. Through this opening a uterine sound was introduced into the stomach and through the constricted pylorus into the duodenum.

The peritoneum and muscular coat, but not the mucosa of the pylorus, was then incised transversely, which allowed the pylorus to yield readily. The uterine sound was then removed and graduated urethral sounds were rapidly introduced in its place one after another until a No. 16 English scale was passed. A short section of the hypertrophied pyloric muscle was then removed and the wound in the

peritoneal and muscular coats closed in the opposite direction from the way in which it had been made. The sound was then removed and the incision in the anterior wall closed. Both wounds were closed with catgut and covered with linen peritoneal sutures.

The baby stood the operation well considering its exceedingly weak condition. Salt solution, which it had been taking by bowel, was continued. The following day it was allowed a little diluted warm milk. It vomited more or less for several days and continued to lose until it had lost a pound, bringing its weight down to 5 pounds. It then began to gain in strength and weight and left the hospital at the end of four weeks. Some time before leaving the hospital it resumed nursing at the breast and retained the milk. Its stay in the hospital was prolonged on account of the fear the mother had of assuming the responsibility of its care.

At the end of six months the baby weighed 11 1/2 pounds, a gain of 5 1/2 pounds in three and a half months. A letter from the father dated June 5, 1914, states that the baby is absolutely well. Another child of the same parents, now three years old, vomited a great deal from the time of its birth until it was eight months old, but it continued to gain in weight right along and after the eighth month the vomiting ceased and did not trouble him after.

The simplicity of the operation, the fact that it can be done in a few minutes, that its technic is much easier than a gastroenterostomy in an infant, and the further fact that it leaves the organs in normal relations, should recommend it to surgeons.

I believe its general adoption will reduce the mortality rate, which is now about 50 per cent., very materially in this condition.

DISCUSSION.

Dr. Miles F. Porter, Fort Wayne, Indiana.—In this and similar operations in patients who are very much reduced, as these babies are, I think we might save life now and then if we introduced into the bowel before we closed the abdominal wall or wound, three or four ounces, or as much as you please, of some nutrient. The child needs it very badly. You can introduce it into the bowel in a moment without additional shock and by so doing can save a baby now and then which we would lose by omitting this little detail.

Dr. John W. Keefe, Providence, Rhode Island.—I have been much interested in Dr. Bonifield's paper. Surgeons have been in the habit of doing gastrojejunostomy on the adult, and with good results, and consequently when a case of the type the doctor has reported comes up, we say gastrojejunostomy is the operation to do. But this pyloroplastic operation that Dr. Bonifield employed is a

simpler operation and it will save more lives than the more serious one of gastrojejunostomy. Most operators have had a mortality of about 50 per cent. from gastrojejunostomy, for pyloric stenosis in infancy, while with this little operation of practical pyloroplasty the mortality is not high. Various operators who have not had very much experience with it have done this operation; some five different surgeons have done it and each of their patients has recovered, which means a good deal for the simplicity of the operation. I would urge those of you who have not done it to try it when you get the opportunity, as you will find your mortality will be decidedly less, than with gastrojejunostomy.

As to the ultimate results, one of these cases was a boy, who is eight years of age now, and within two weeks the grandfather told me how strong and well the child was and how he was able to eat and take any kind of food. The ultimate result is good.

Dr. Bonifield (closing).—Let us suppose that this is the hypertrophied pylorus, and the stomach is dilated as I have tried to represent it (indicating). A very short incision is made in the anterior wall of the stomach to introduce a sound. I use a uterine sound passed through the pylorus into the duodenum. Then make a longitudinal cut down to the mucosa, but not through it, using the uterine sound as a guide. The uterine sound is then withdrawn. Take a set of ordinary urethral sounds and pass one after another until the opening is dilated to number 16 English scale, which is enough. The muscle is hypertrophied and very dense. It is much like fibrous tissue when you dissect it out and comes out in fragments. You must dissect some of it out to get the wound to come together in the opposite way from that in which it was made. The caliber will be large. It is closed with a double row of stitches and with the sound in position.

ABDOMINAL DRAINAGE.

BY

JOHN W. KEEFE, M. D., F. A. C. S.,

Providence, R. I.

Drainage of wounds is a subject that has received careful consideration duirng many centuries. It may be said to be as old as the hills, for do we not find in the earliest medical writings mention of lead and brass tubes having been used to drain both the pleural and abdominal cavities?

When to drain and when not to drain, how to drain and where to drain, how long to drain, and whether to drain at all, and what is the most desirable drainage material? These are questions which are by no means settled at the present day. The subject of drainage still continues to be in a state of evolution.

We must admit that gravity is the most important aid to drainage and that next in importance is capillary attraction procured by a tube or gauze, or both The absorptive power of the peritoneum is least in the pelvis and gradually increases upward until it is greatest at the diaphragm. It was at one time advocated that we elevate the foot of the bed to cause the flow of infective material toward the diaphragm, where it would become more rapidly absorbed and eliminated. It was then found that the patient might become overwhelmed with the amount of toxins absorbed. Later, upon Fowler's recommendation, gravity was again called into play and we raised the head of the bed and even placed the patient in a sitting posture.

Most of us remember the glass tube placed through the lower angle of the abdominal wound and into the pelvis, at the close of nearly every abdominal section, and the glass syringe with a rubber tube attached which was used at frequent intervals to remove the fluid which accumulated in the glass drainage tube. After some years it was found that infection of the peritoneum occurred, at times, through the use of the drainage tube and syringe. Also, ventral hernia at the site of the drainage opening was a not infrequent aftermath. Now the glass drainage tube is seldom seen in the surgeons armamentarium, as we soon learned that the peritoneum was capable of taking care of a considerable amount of toxic material.

There is a growing tendency to drain less and less. Recently some surgeons notab'y Dameron, Wallace and Adams have advocated closing the abdomen without drainage, after removing a gangrenous appendix with free pus in the peritoneal cavity. These methods to me seem too extreme.

Infection of the abdominal structures, especially the fat and fascia, is likely to occur and may require drainage. Owing to the adhesions which rapidly form around the drainage tubes, their value is limited in the treatment of peritoneal infection; for since the tissues of the abdominal wall possess a much lower degree of resistance than the peritoneum, drainage of the former may frequently be called for where drainage of the peritoneal cavity is not necessary. The presence and pressure of a drainage tube in the peritoneum adjacent to covering the bowel, may determine the transudation of organisms from the lumen of the gut to the peritoneal cavity.

No one now thinks of draining the pelvis following the removal of the uterus, tubes or ovaries; unless there are unremovable bacteria; capillary hemorrhage, requiring packing with gauze, or injury to the ureter, bladder or rectum. We do not now drain where clean blood is found in the peritoneal cavity following injury or ruptured tubal pregnancy. The peritoneum has shown itself amply able to care for this extravasated blood as well as normal bile or urine which may have entered the abdominal cavity.

The ancient dictum of *ubi pus ubi evacuo*, still holds good with reference to pus in or about the abdominal viscera.

Our countryman, the celebrated Dr. Peaslee, as early as 1855, drained the pelvic cavity by making an opening through the vagina posterior to the cervix into Douglas' culdesac.

We can aid gravity by the use of a soft rubber drainage tube or a wick of gauze, but intraabdominal pressure also assists the flow of fluids into the vagina. This intraabdominal pressure, I believe, is an important factor in forcing fluids through our drainage wounds.

The materials in use at the present day are soft rubber tubing, gauze wicks, cigarette drains, made of gauze covered with soft sheet rubber tissue, or a rubber tube cut spirally with a gauze strip drawn through its lumen. The number and the type of drains to be used, their location and the length of time they are to remain, vary with one's experience and judgment.

Should it be deemed necessary during an abdominal operation to drain the pelvis through the vagina, the drainage tube, or gauze or both, should be passed from the abdominal cavity through an

opening made from Douglas' pouch into the vagina and never from the vagina into the pelvic cavity. The vagina may be readily entered by lifting the uterus, thus making the uterosacral ligaments prominent and cutting with a knife, or scissors, close to the cervix between the uterosacral ligaments into the vagina.

Boveé suggests, in cases where the uterus has been removed, leaving a cervical stump, passing one blade of a scissors through the cervical canal and cutting the cervical stump posteriorly, thus entering the vagina.

The surgeon should never rely upon an instrument passed from below by an assistant, but make the opening from above as described, where there is no danger of injuring important structures. A case is on record where an assistant while endeavoring to place an instrument in the vagina, as a guide, to assist the surgeon in making an opening in the vagina from above, had passed the instrument, by mistake, into the rectum, and the gauze was drawn from the pelvis out through the rectum with a fatal result. In another instance the instrument was passed through the urethra and bladder, and the bladder was incised instead of the vagina.

The site of the incision made to open the abdominal cavity should be determined not only by the nature of the disease or seat of the tumor, but also with a due regard for a suitable place for drainage

Saline cathartics and the use of large quantities of water per rectum, flush the kidneys and bowels and thus remove toxic material. These are very potent adjuncts to external drainage.

Where shall we make our incision for removal of the appendix? While each case is a study in itself and no hard and fast rules should be laid down, yet we may mention our belief in the value of certain methods of procedure. Take a case of chronic appendicitis, interval operation, where we wish to examine the stomach, pylorus, duodenum, gall-bladder, as well as the uterus, tubes and ovaries, the vertical right rectus incision undoubtedly gives us the most desirable access to these parts.

The cases of acute appendicitis, however, present an entirely different problem. Most of these cases will require drainage whether the appendix is removed or not, hence the incision should be made in a location best adapted for adequate drainage and least likely to be followed by hernia. We know that drainage through a right rectus incision is frequently followed by hernia, hence I wish to emphasize the value of the McBurney or muscle separating incision, not only because by this method adequate drainage can usually

be obtained, but the abdominal wall is left in a more normal condition and hernia at the site of the drainage opening seldom occurs.

I am not in accord with those who say that the McBurney incision should not be selected when we find drainage necessary. I have time and time again proved that excel ent drainage may be obtained through the McBurney incision. I firmly believe that the McBurney incision is the most desirable one in cases of acute appendicitis, whether we wish to drain or close the wound without drainage. The opening can be made sufficiently large so that we can remove the appendix, examine the uterus and both tubes and ovaries and allow us, if necessary, to remove the tubes and ovaries.

An examination of the pylorus, duodenum or gall-bladder should not be attempted in acute cases of appendicitis owing to the danger of spreading toxic material to other portions of the abdominal cavity. The low right rectus or median incision may be desirable where we feel that there is need of pelvic surgery as well as surgery of the appendix. These incisions may be closed throughout and drainage carried out by means of a drain inserted through a separate stab wound. Stab wound drainage is of distinct value and should be more often employed. We should remember, however, the fact pointed out by Coffey that a drain is efficacious only in proportion to the area of a transverse section at the point of construction.

Our cigarette drains at times not only do not drain but seriously interfere with drainage by plugging the wound and causing retention of secretions. This condition of affairs may be avoided by the use of the rubber drainage tube which keeps the edges of the wound apart and allows fluids to pass through the lumen of the tube. These tubes were more frequently employed in the past and with great benefit.

Drains are of value not only on account of their capillary action, but because they can be used to wall off and thus protect the uninvolved structures from the field of infection. They are of decided assistance in checking troublesome oozing when not readily accessible or when difficult to stop by ligature. A drain also aids in the formation of a sinus to the site of the infected area.

Formerly many cases of appendicitis were drained by making one opening in the right iliac region near the anterior-superior spine of the ilium and another in the loin and drawing a rubber tube through from one opening to the other, and I believe that this method may be used with advantage to-day in certain cases with large abscesses. Sometimes a yard or more of gauze was used to wall off the appen-

dicial region and even allowed to remain several days, requiring the administration of an anesthetic for its removal on several occasions.

Dr. Morris did yeoman service by ridiculing this procedure. He said these men who stuffed their patients with gauze were not surgeons, they were taxidermists. We all now realize that great injury may be done by using too much gauze. One or two cigarette drains are usually sufficient for adequate drainage following the removal of a gangrenous appendix. One drain should be placed at the site of the appendix, the other in the pelvis. They should be removed in one or two days and replaced by a rubber tissue drain.

A counteropening in the right loin is of value occasionally where large abscesses have formed and vaginal drainage is sometimes desirable where we have large collections of pus in the pelvis the result of appendicitis.

Drainage is carried out in cases of acute pancreatitis by placing drains in contact with the pancreas through openings made in the gastrocolic or gastrohepatic omentum. Certain cases may require incision into the pancreas. The region of the pancreas may also be reached through an incision in the back, in the left costoiliac space. This method of approach has been seldom used on account of the fear of injuring important blood-vessels.

A subdiaphragmatic abscess may be reached by an incision into the abdominal cavity made in the right eleventh costal interspace in the posterior axillary line. Certain cases may be best reached through a high right rectus incision. The transpleural operation, to reach a subdiaphragmatic abscess, is mentioned only to be avoided.

Drainage is the most important thing to be secured in disease of the biliary tract. How, then, is this best brought about? At one time we opened the gall-bladder and stitched the edges of the gall-bladder to the edges of the parietal peritoneum. While this method has been efficacious in some instances, it was found to be followed for some months by a pulling sensation at the site of the scar.

Many surgeons now pass a rubber drainage tube into the gall-bladder and close the opening about the tube with a purse-string suture of chromic gut, one end of this suture is then passed through the tube and tied, this holds the tube in place until the catgut dissolves, which is usually about the tenth day. A cigarette drain passed by the side of the gall-bladder to the cystic duct takes care of any oozing or secretion which may have run down the side of the gall-bladder during the operation. This drain can be removed on the second day and replaced by a rubber tissue drain from day to day as long as drainage is required.

The common duct can be drained by placing a small rubber catheter, the end of which has been removed and an opening made in its side about 1 inch from the end, through the common and hepatic ducts and into one of the branches of the hepatic duct. The opening in the side of the catheter is placed opposite the entrance of the other branch of the hepatic duct, one or two sutures are now used to fix the catheter in the opening in the common duct.

Drainage of the gall-bladder with a drainage tube and a cigarette drain to the common duct may be all that is necessary.

Should we drain our cases of tuberculous peritonitis or is it sufficient to open the abdomen and allow the fluids which have accumulated to escape and close the abdominal wound? I have seen a number of cases relieved and some cured by this latter method.

Drainage is most effective when we call to our assistance the forces of gravity, capillary attraction and siphonage.

CONCLUSIONS.

1. Drain when necessary, but only with suitable material and not for too long a time.

2. Aid elimination and assist drainage by large enemata of water and saline cathartics. The abdominal incision should be made with a due regard for drainage.

DISCUSSION.

Dr. Charles W. Moots, Toledo.—I would disagree with the part of the paper that refers to making an incision with the idea of drainage. I consider it much better to make your incision with reference to removal of the pathology, and a thought of the anatomy of the parts, and consider drainage afterward. I am glad the author refers to the stab-wound drainage. For some time, even in gall-bladder drainage, I have been using a stab-wound away from the line of incision, and we find we get along very nicely. Therefore, I am decidedly in favor of getting drainage away from the line of incision if possible.

Dr. Albert Goldspohn, Chicago.—We must always bear in mind that the peritoneal surfaces very soon agglutinate together to shut out any foreign body, any tube, any gauze, any drain we may put in. When we introduce a tube they can do that very quickly. You may move the tube and it does not break down this new wall of agglutination that has been formed. If we introduce a gauze rope or something that will slip in easily, we will have the same thing occur. If we introduce gauze, there will be a fibrillary adhesion for the first day or two to the viscera and the serous surfaces, and it will

stick until enough time has elapsed, say some four or five days, until an exudate forms, and that causes the foreign body to become loose from the tissue. Therefore, gauze is superior to any smooth surface as a drain because capillary attraction will be really active, thoroughly active, for about forty-eight hours. Soon after that the fibers become saturated with fibrin or mucin, and it may be in danger of becoming a cork. We can disturb the agglutination between the gauze fibers, and the tissues and renew drainage thereby from day to day. By beginning to move strands of the gauze after forty-eight hours, we reestablish active drainage. Intraabdominal pressure assists capillary drainage to move the liquid uphill. Therefore, I want gauze drainage; but if we leave the incision in the abdomen so wide open that gauze will not be constricted and drainage not interfered with by constriction in the abdominal wall, then we will frequently have a hernia follow. I have overcome that difficulty in my practice with satisfaction by having an oval glass tube constructed that is only long enough to go through the abdominal wall and a little further, and has a lumena of from about 3/4 to 1 1/4 square inches, with a flange outside, so that it is practicable. I put the gauze or cigarette drain down through that tube. I do not care to have the gauze walled off by anything after it gets inside beyond the parietal peritoneum. The pain in pulling it out comes from contact with the parietal peritoneum, but the visceral peritoneum does not have much feeling, and the former we protect with the glass tube. If the drainage becomes inactive after forty-eight hours, I begin to pull enough to break up agglutination, and start up new drainage. I close the abdominal incision, all the layers of fascia and everything solid up against the tube from both ends of the wound, so that when the tube comes out the small wound collapses, and we practically never see any hernia.

Dr. Frank D. Gray, Jersey City.—Gauze will drain water. Its fine capillarity is such that it will not drain a thicker fluid like pus; consequently the cases where we need drainage of pus are not to my mind provided for by gauze drainage. Where we need serous drainage, only, gauze is sufficient. In my opinion the most efficient abdominal drain ever devised was proposed by Peple, a surgeon of Richmond, Virginia, about three years ago. This drain is made by splitting a piece of rubber tubing longitudinally; inside of that is placed some folded rubber dam, so that you have from six to ten thicknesses longitudinally or lengthwise, sewing this to the posterior wall of the split tube by two or three interrupted sutures to keep it in place. You have a certain amount of capillarity that an empty tube does not possess, and yet you do not have the plugging quality of gauze. I have used this drain with great satisfaction for the last three years.

The question of when to drain was not touched on. We find cases of early appendicitis where there is apparently a purulent effusion in the peritoneal cavity, but this fluid in most cases is harmless. It is serum filled with leukocytes. It is, in all probability, sterile. These cases can be left without drainage. Late cases of

pus accumulation, like old pus tubes, are generally sterile and can be left without drainage. The mid-way cases are dangerous and we ought to drain them.

Dr. Emery Marvel, Atlantic City.—With reference to the question of drainage, in cases in which it is desirable to drain, it is very essential to know how best to care for the material draining. Realizing that this discussion is being held in a meeting where diseases of women are mostly considered, I hope I am not presuming too much if I should trespass for a minute on the Association's time to present a little apparatus which has served me well in remedying a very difficult and annoying condition in connection with suprapubic cystotomy. Those of you who have done suprapubic cystotomy and prostatectomy know that there is excoriation of the skin of the scrotum and thighs where the urine comes in contact. This is especially true after the tube has been removed. In addition to that, it is disagreeable to the nursing staff who has to do with the bedding. In attempting to secure a means of overcoming this annoyance, I went to Lentz of Philadelphia and suggested a means whereby sufficient pressure upon the abdominal wall could be secured to prevent leakage, which pressure should be of such a nature that it would not be injurious to the skin of the abdominal wall. It should limit all fluid to its confines, and have a reservoir for collecting. We took the pneumatic collar of an Allison by inhaler which when inflated pressure over the suprapubic aperture can be attained. A metal cap with drainage was provided. The device is very simple and convenient and it can be strapped to the abdomen with suspender straps and can be held taut. The usual reservoir or urinal, is placed upon the leg into which the urine is collected. I want to recommend this device to you as being very useful. Where a patient is greatly distressed by urine trickling down the surface, this contrivance affords relief. In twenty-four hours the skin was dry and all irritation had disappeared in the case where I used it. It can be worn while the patient is in bed, standing or walking.

Dr. J. Henry Carstens, Detroit.—If my friend Dr. Goldspohn, of Chicago, had ever had a gauze drain in his abdomen, he probably would treat his cases a little differently than by establishing drainage by means of gauze, because if there is anything that hurts a patient it is to take that gauze out, and gauze absolutely stops drainage inside of twenty-four hours as we have demonstrated. It is not that you have to wait until it is loosened, which does not take place in a few days; it may take ten days sometimes, and still be adherent. Not only do you hurt the patient by pulling out the gauze you put in the abdominal cavity, but you *liberate some of the adhesions* that have been formed in the gauze, and these adhesions open the general peritoneal cavity and some of that virulent pus and toxins may get into the abdominal cavity. Every time you pull out some gauze the patient will have a severe attack of pain until Nature walls off the opening, and the next day you pull out some more gauze and there will be some more pain. There is nothing like a plain rubber tube for drainage, and you can use the smallest kind if you wish.

This brings up the question of the size of tubes to use. The nurse comes along with a tube 1½ in diameter, and I say to her, "I am not a veterinary surgeon; I am not operating on elephants; I am an abdominal surgeon, and I want a small tube." I use a tube ⅓ to 1 inch in diameter, and if necessary I put in two, but one is generally enough. I do not have it perforated because it so happens that once in a while I wish to wash out the bottom of the cavity, and if the tube goes to the bottom I can wash it out. What I would plead for is a simple, plain rubber tube for drainage purposes. You do not have to use it very often.

Reference was made to opening the vagina from above. I have had constructed a special perforator of the culdesac, and I can do that myself. I need not put my finger into the vagina; I do not like to do it when performing an abdominal operation. I can put that instrument in the vagina, I can feel with the other hand the posterior culdesac, and when it is in there I can perforate. Take hold of the rubber tube, and pull it down the vagina, and the whole thing is done.

Dr. Marvel has described and demonstrated an apparatus which he uses in cases of suprapubic cystotomy. When I do that operation I put in a little rubber tube, sew it up close so that nothing comes outside of the tube. To that tube I attach a small piece of glass tube, and then a longer tube that goes on the side, and as a result I have not a particle of leakage. I can watch the glass tube to see what is going on.

As I have said, I wish to make a plea for simplicity, in very very rare cases only is gauze of value. Let this miserable gauze business alone, as gauze causes a great deal of trouble. The atmospheric and intraabdominal pressure will force out fluids through the tube.

Dr. William Seaman Bainbridge, New York City.—There are a few points in connection with this very interesting paper to which I desire to call attention. It brings me back to the time of Charles McBurney, when, as his house surgeon, I often heard him speak of what he called the grid-iron incision which we now call after him. He frequently explained that by extending upward and outward, or downward and forward, good drainage could be easily obtained in pus cases. Although severely condemned by many for use in septic patients, it is interesting to hear Dr. Keefe strongly advise it. I have seen it employed many times, and have employed it myself in a great many cases, with excellent results.

The rubber drainage tube is highly recommended. In connection with this I would like to bring to your notice the oft-repeated advice of Sir Berkeley Moynihan, given to us at Leeds, never to use a rubber drainage tube at all for the drainage of other than hollow organs unless the tube be split either directly or spirally. A drainage tube is likely to become plugged where there is coagulating matter to pass through it. I always split the tube.

Another point is in connection with the drainage of cases of tuberculous peritonitis. Drainage of these cases, unless they be of the mixed type, is unfortunate for the patient. I think it simply adds

to the adhesion already there. I take it that we are discussing the type that might have fluid to drain, but there are cases of tuberculous peritonitis that do not need drainage. Instead of employing a drain, which means an added number of adhesions, it has been my practice for the last ten years to introduce into the abdomen, after the adhesions have been broken up, and the fluid removed, 95 to 98 per cent. pure oxygen. This is introduced and the individual is blown up to the fullest extent possible, and the wound absolutely closed. The oxygen will remain for from forty-eight hours to a week, depending upon the amount used. Oxygen has a definite effect in inhibiting the growth of organisms, helps prevent adhesions, acts as a tonic, and diminishes the likelihood of the fluid reaccumulating. I would not like to return to the old method of draining these cases.

Dr. Robert T. Morris, New York City.—The question of whether capillarity or gravitation exerts a greater force is one that relates to the character of the fluid to be drained. With a thin fluid to be drained, capillarity has the greater force. With a thick viscid fluid to be drained gravitation exercises a greater force. With the question of abdominal pressure comes the whole question of atmospheric pressure. Atmospheric pressure causes abdominal pressure. When I squeeze a grape I will get the inside of the grape out. That is the question of abdominal pressure in relation to free fluid within.

As to gauze drainage, I have not a great deal to say. In the days when we packed patients with gauze and iodoform gauze at that, I spoke of committing taxidermy upon these patients. The idea of gauze drainage is fallacious unless you use a Mikulicz apron, a covering of gutta percha tissue or rubber dam. The small capillary drain surrounded by gutta percha tissue would drain well enough in most cases.

In regard to closure without drainage, Dr. John G. Clark and I in 1895, published papers and took the first stand upon the subject, and the profession fired at us with murderous 13-inch guns and everything you could imagine. Then the question was forgotten altogether for seven or eight years. Now, the profession is taking it up again. There are very many cases of septic peritonitis that can be closed without any drainage whatever, depending upon the leukocytosis which has been established by the patient for disposing of infection. In regard to tuberculosis of the peritoneum, it makes no difference whether you blow the patient up with hydrogen dioxid, or inject iodin through a trocar, or whether you open and put in a wick drain, or whether you do not drain at all, so long as whatever you do excites a great degree of local hyperleukocytosis. That is the idea. It is the hyperleukocytosis which wipes out the tubercle bacillus. I thought it was the saprophytes at one time, and I took the fluid that entered by way of the drain, extracted the globulins, and used them against test-tube cultures of tubercle bacillus, and came to the conclusion that it was the saprophyte toxins which destroyed the tubercle bacillus and brought about a cure in these cases. But I know better now. Anything that will excite a great degree of

hyperleukocytosis within the peritoneal cavity will have a tendency to wipe out the tubercle bacillus.

Dr. David Hadden, Oakland, California.—In this connection I would like to speak of the work of May. His work emphasizes the importance of protecting as much as possible the omentum, and not removing the least portion of it if we can help it. He took sterile beads and placed them in the abdomen and found after varying periods of time that these beads were always free and undisturbed. The same beads, infected, were taken up by the omentum and formed a beautiful apron, no matter in what part of the cavity they were originally placed. Around the beads was deposited lymphoid material with the formation of lymphatic glands. I regard that work as exceedingly interesting in connection with this question of abdominal drainage.

Dr. Keefe (closing).—In some of our large hospitals we find cases of appendicitis that have been going on from four to twelve days. I do not think we can treat these cases as we do the interval cases. I think it is very important as to where we make the incision. The primary incision in the loin may be best. I have a case in point that came under my observation five days a ago where the abscess was in that direction. If I had opened at the site of the appendix and searched for the appendix and later found a pint of pus in his loin, it strikes me it would be much wiser to have attacked the pus where it was. I made a small opening and drained, and found a fecal concretion which proved to me that the trouble was appendiceal, that the appendix was perforated and had become gangrenous. I did not see the appendix. I think it is much wiser not to search for the appendix in many of these cases. It is important to know whether you are going to drain or not and make your incision to conform to that decision. In comparatively clean cases we may drain through a stab-wound alone, but in the cases with large collections of pus, in the neglected cases, I still believe we should make our incision over the point where the disease is most prominent. We know that a cigarette drain will not drain pus, but we also know that a tremendous amount of serum is thrown off and the pus is diluted, and the cigarette drain will drain that fluid which contains pus and serum.

THE TREATMENT OF URINARY CALCULI AS BASED ON THEIR CHEMICAL COMPOSITION.

BY

CHARLES B. SCHILDECKER, M. D.

I. Introduction. BEFORE a pathological concretion may form it is essential that there be a nucleus of some substance different from the substance to be deposited. Upon the nucleus substances crystallize out of solution and in few cases would the concretion form, were it not that the solution contains an excess of some substance. However, the nucleus may, in certain instances, cause the precipitation of the substance. Concretions consist, therefore, of mixtures of colloids and crystalloids deposited from solutions of colloids and crystalloids, and, on this account, the application of the principles of colloidal chemistry throws considerable light on the conditions of their formation.[1] It is to be remembered that the constituents of urinary calculi are derived from the secretion of the kidney and are usually deposited on account of an over saturation of the urine or on account of a change in the composition of the urine, which renders them insoluble. Although the amount of colloidal material in the urine is small, it plays an important part in keeping in solution the less soluble crystalloids, such as urates and calcium oxalate. In inflammatory conditions, fibrinogen appears, which readily forms the irreversible fibrin, and conditions thus become favorable for the formation of concretions made up of any crystalloid that the urine may be saturated or oversaturated with at that time. Aschoff and Kleinschmidt[2] claim that most urinary calculi begin as primary calculi formed independent of any inflammation, but from an excess of the main constituent (uric acid, oxalates, xanthine, ammonium urate); this calculus then forms the crystalline nucleus of the laminated secondary deposit of other substances (uric acid, oxalates and phosphates); all being deposited without inflammation. The inflammatory formations are usually deposited on a foreign body or a primary calculus and are composed chiefly of ammonium-magnesium phosphate and ammonium urate.

Urinary calculi may consist of the following substances, uric acid, indigo, ammonium urate, xanthine, cystine, urostealith fibrin, cholesterol, calcium carbonate, calcium oxalate, calcium and magnesium phosphate (the so-called bone earth) and triple phosphate (ammo-

nium-magnesium phosphate). It was formerly taught that most urinary stones are composed of uric acid or urates, but recent studies show that this idea is wrong, and that the majority of urinary stones are composed of calcium salts. They have also shown that it is impossible to determine the nature of the stone by macroscopic examination, that the only method is to examine it chemically, and that the treatment instituted should be based on the character of the stone. It is especially important that those subject to urinary lithiasis should be treated along the lines suggested, after the nature of the stone or gravel has been determined, as it is only by this procedure, that we may be able to prevent the formation of new stones or the further growth of the primary stone.

II. Dietetic and Medicinal Treatment of the Various Varieties of Urinary Calculi.—(*a*) *Phosphate calculi:* The dietetic indications are to diminish the intake of calcium, thereby putting the phosphate in a more soluble form. Foods rich in calcium are therefore to be avoided, such as, milk, fish, eggs, beer, wine, liquor and fruits, while meat, potatoes, cereals, broths, sugar, sweets and puddings are allowed.

Medicinally hexamethylenetetramine and acid sodium phosphate should be given. Diuresis should be promoted by advising the use of large quantities of water. Of course in those cases where hyperacidity of the gastric juice is present, this must be treated along appropriate lines.

(*b*) *Uric Acid Calculi.*—It will be remembered that the uric acid of the urine has a twofold origin, the endogenous, derived from the metabolism of the tissues and the exogenous, derived from the decomposition of the food. The endogenous is constant for the same individual and is uninfluenced by diet, while the exogenous can be profoundly influenced by diet. It must also be remembered that the deposition of uric acid from the urine does not depend entirely upon the amount present, but very largely on the chemical relationships determining the formation in which the uric acid is excreted, and that in order for it to remain in solution in the urine, the reaction of the urine must not be too acid and salts must be present to unite and form the necessary bases.

The dietetic indications are for a mixed diet with a preponderance of vegetables, fats, and carbohydrates, and low protein of a purin free nature. Liver, brain, sweetbreads, kidneys and fish roe are forbidden; also game, pickled fish, shell fish, sauces, highly flavored foods, mushrooms, broths, beef-tea, meat extracts, coffee, tea, alcoholic drinks, cocoa, chocolate and asparagus. Much salt, and all

salt fish and salt meat should be avoided because uric acid is more easily precipitated from urine containing an abundance of salt.

Fats, milk, whey, milk gruels, eggs, butter, cream cheese, gelatin, peas, beans and fruits are especially good. Enough water should be given to cause about 2000 c.c. of urine a day. Following is a very good dietetic régime:

Breakfast.—8 oz. milk
1 1/2 slices bread and 1 pat of butter
2 tablespoons of cream of wheat with
2 oz. cream and 2 teaspoon of sugar
1 soft boiled egg.

Dinner.— 8 oz. milk
1 soft boiled egg
Potatoes with 1 oz. cream and 1 pat butter
Lettuce and cabbage
1 1/2 slices bread with 1 pat butter.

Supper.— 1 egg
8 oz. milk
2 1/2 tablespoons of cereal with 1 oz. cream and sugar
Crackers with butter
1 cube of cheese
1 cup of tea with 1 oz. cream and 1 tablespoon sugar.

Protein	80 gm.
Fat	112 gm.
Carbohydrate	207 gm.
Calories	2300.

Medicinally alkalies are indicated, as they diminish the acidity of the urine and make it a better solvent for uric acid. The less the acidity of the urine, the greater its content of alkaline phosphates, and, therefore, the greater the quantity of uric acid combined with alkalies, and, therefore, more easily soluble. About ʒi potassi. bicarb., either in powder or dissolved in a pint of water, is needed per day. Celestines, Vichy, about 1 quart a day, is also of service, on account of its high calcium content. Potassium salts are better than sodium salts, on account of the relative insolubility of the sodium salts.

(*c*) *Oxalic Acid Calculi.*—It is to be recalled that the condition of the urine most favorable for the solubility of the oxalates, should present an increased acidity from the double acid phosphates and an increased content of magnesia with a small amount of calcium. Therefore, we must increase the acidity of the urine, decrease the calcium and increase the magnesium.

The diet should be low in carbohydrates so as to prevent their

fermentation, which increases both the formation and absorption of oxalic acid. On account of high oxalate content, the following should be avoided, rhubarb, spinach, sorrel, strawberries, figs, potatoes, beetroot, French beans, tomatoes, plums, tea, coffee and cocoa. Peas, asparagus, mushrooms, onions, lettuce, rice, cauliflower, cabbage, peaches, grapes, apples, carrots, wheat, oats, meat, eggs, butter, milk and sugar may be used. The following is a very efficient diet scheme in oxaluria and related conditions.

DIET SCHEME IN OXALURIA.

7:30 A. M. ..... Glass of hot water.

8 A. M. ..... Fish (haddock, hallibut, cod, hake, sole, plaice, mackerel, salmon, trout, etc.).
Eggs (lightly boiled, poached, or scrambled), bacon, ham, chops, or steak, stale bread or dry toast with plenty of butter, fruit, (apples, oranges, pears, pineapple, peaches, melon).

11 A. M. ..... Glass of water.

1 P. M. ..... Soup (potato, onion, pea, carrot, asparagus), eggs when not taken at breakfast, chops or steak, cold meat, chicken, tongue, ham; vegetable salads with French dressing; fruit (as at breakfast), a glass of milk or water.

4 P. M. ..... Glass of water.

7 P. M. ..... Raw oysters, soup (as at lunch), fish (as at breakfast). beef, mutton, chicken, vegetables (potatoes, cauliflower, Brussels sprouts, French beans, peas, carrots, lettuce), fruit (as at breakfast), cheese, toast and butter, glass of water.

10 P. M. ..... Glass of hot water.

Note..... Take only easily digested vegetables. Avoid too much milk, but take an abundance of water.

Must avoid..... Spinach, sorrel, rhubarb, tomatoes, beet, celery, cucumber, broad beans, haricot beans, grapes, plums, gooseberries, sugar or sweets. Pepper and all condiments and highly seasoned foods. Sweet-breads. Liqueurs and brandy. Figs and gooseberries.

Medicinally acids should be given, for example:

(1)	Acidi nitrici diluti	℥ii
	Tinct. cinchonæ comp	℥i
	Syr. zingiberis	℥i
	M. et S	℥i t.i.d. p.c.
(2)	Acidi lactici	℥i
	Tinct. aconiti	Mx
	Tinct. gentianæ	℥ii
	Syr. aurantii	℥iv
	Aq. dest. qsad	℥ii
	M. et S	℥i t.i.d. p.c.

(3) Acid sodium phosphate gr. xxx per day.

The magnesia of the urine may be increased by giving magnesium salts or burnt magnesia gr. xxx per day.

(*d*) *Cystine Calculi.*—The cystine calculi are very rare but of great interest.(4) It will be recalled that cystine is a sulphur-containing constituent portion of the protein molecule. Under normal conditions all of the cystine taken in the food is completely oxidized, but certain individuals have lost this power and in these people calculi often form. The only indication we have had for treatment is based on certain experiments showing that with a restriction of the protein intake the amount of cystine excreted is greatly lessened. Recently Klemperer and Jacobi(5) have described a case of this condition whereby the administration of six-ten grams of sodium bicarbonate per day caused the cystine to disappear from the urine.

(*e*) *Very Rare Calculi.*—The indigo, xanthine, urostealith, fibrin and cholesterol calculi are so extremely rare and so little is known regarding their pathogenesis, that nothing can be said regarding their treatment except in regard to the xanthine stones, as in this case the indications are the same as those for the treatment of the uric acid stones to which it is closely related chemically.

III. Conclusions.—An attempt has been made in this paper to call attention to the importance of the chemical examination of urinary stones and also the treatment of same as based upon their chemical composition. While our knowledge of all the chemical factors that play a part in the formation of urinary calculi is limited, still it is our duty to apply the knowledge we do possess at the present time. I have no doubt that the application of the principles mentioned in this paper, will prove of service in the treatment of calculi, both as regards their new formation and also as regards their further increase in size and number.

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BACTERIOLOGICAL FINDINGS IN THE URINE IN CASES OF KIDNEY PTOSIS.

BY

DAVID HADDEN, M. D.,

Oakland, Cal.

THE full estimate of the value that is to be derived from the bacteriological examination of the urine for the purposes of diagnosis has not yet been reached. However, the simple presence of bacteria in the urine is not diagnostic of urogenital tract infection.

The experimental intravenous injection of cultures results in the appearance of the germ in the urine after a short interval of time. The typhoid bacillus and other germs free in the blood in disease, are recoverable from the urine by culture. These facts justify the conclusion that the kidney has a germ excreting function, and that the urine is not sufficiently germicidal to destroy all the bacteria.

That the urine has in itself when normal a certain amount of germicidal power, is the opinion of some observers. This is shown by the preliminary decrease of bacteria that occurs the first few hours after voiding. The action is not marked, for under the slight modification from moderate degrees of heat or exposure to air it disappears and then the urine becomes a good culture medium. This would point to a ferment rather than a chemical ingredient as a cause for the germicidal power, though Guiteras claims that it is the acid potassium phosphate that is the protector.

On the other hand, urine from an infected bladder or kidney probably loses its germicidal power through chemical changes previous to voiding and a rapid increase in the number of bacteria continues.

In using a plate culture to determine the number of germs, it is important to allow as little time as possible to intervene between the catheterization of the patient and the inoculation of the culture medium, since the variation in the germ content of the urine will naturally modify the results and depreciate the value of the findings. However, simply for purposes of diagnosis, aside from strictly scientific investigation, the variation in twelve hours' time is not of great consequence.

A catheterized specimen is essential for results of value, since it is important to eliminate urethral contamination. A more uniform

specimen is probably obtained by discarding the first few cubic centimeters, and in cases of bladder stasis, I prefer to discard also what would naturally be the residual urine.

The consensus of opinion is that urine in normal individuals is free from germs. On the other hand, some observers report finding a considerable percentage of presumably healthy individuals, whose urine contained bacteria. Many individuals with absolutely no urinary tract symptoms may have the urine loaded with germs.

Brown in Osler's *Modern Medicine* says: "It is important to remember that the epithelium of this tract is extremely resistant to infection, and that in the vast majority of cases certain predisposing factors must be met with before inflammation is set up. The weight of evidence, however, certainly points to the belief that the urine of healthy individuals, if obtained under careful precautions, contains no bacteria. That the organs and urine of absolutely normal individuals are free from bacteria, has the weight of authority, and thus, at the present time at least, it is not fair to assume that we may have autogenous infections of the kidney."

These and other authorities thus give sufficient indirect proof of the necessity of a complicating factor for the continuation of acute inflammations in the urinary tract.

The conclusion that a predisposing factor must be present in addition to the bacteria in the urine to give rise to infection is necessarily correct if such findings of bacterial contaminated urine are frequent.

The experimental results obtained by various observers in producing bladder infections by ligation of the urethra following subperitoneal, intravenous or rectal injections of cultures are conclusive of the necessity of the presence of a mechanical factor associated with the germ in the urine, but offer little proof of the path of germ travel to the bladder.

The source of infection in women may be through the urethra, from the blood stream or as direct extension from adjacent organs. The direct extension was clinically proven by Reymond in 1893, who after ligation of the urethra and injection under the bladder peritoneum recovered the germs from the urine in the inflamed bladder, but found the kidney, urine, and blood sterile. The pathogenic germ of pelvic lesions in women is often recoverable from the urine of the uninflamed bladder, and yet is not found in the kidney urine or the blood. This is notably so in the diphtheroid bacillus infections of the cervix and vagina. While a direct extension is possible, the course through the urethra is more likely. In Rey-

mond's experiment by the tying of the urethra, a factor of violence was added through the overdistention of the bladder sufficient to force the germs through the wall and so to produce a cystitis. A factor of violence even for a moderate degree is sufficient to produce a cystitis in women, but its permanency will depend on the pathology present and induced.

The possibility of autogenous infection, though denied by some men, has many findings in its favor, but the need of mechanical interference to the urine flow in addition seems important.

Acute inflammations of the bladder are as a whole of short duration in an organ that has perfect drainage. The chronic conditions are almost invariably associated with interference to complete emptying that is not necessarily associated alone with bladder complications, but often a stasis that is the result of other pelvic pathology.

Acute pyelitis following or associated with general infections will also respond readily to medicinal treatment when the kidney drainage is free. The infection associated with imperfect drainage is the one that becomes chronic and resistant to treatment. Hunner reports such cases cured by dilatation of ureter strictures. Edebohls, Box, and Newman have reported unilateral nephritis cured by kidney fixation. In discussing their reports, Dieulafoy says:

"Edebohls, Box, and Newman have claimed to cure one-sided nephritis by fixing a movable kidney—cases where the kidney was enlarged, painful, and the albumin abundant. The movable kidney was supposed to be exempt from lesions for a long time. Although the cases reported by Edebohls do not give all the medical details of the question, it is none the less true that people with movable kidneys have albuminuria. The albumin is present in 14 per cent. according to Schilling. The term Bright's disease implies the idea of bilateral nephritis. The presence of albumin and casts in the urine is not sufficient to prompt the diagnosis of Bright's disease. This confusion is made by surgeons. It may falsify our ideas. I am of the opinion that some of the cases are due to tuberculosis. In some of the published cases, nevertheless, it does seem that tuberculosis was not present and that they were really cases of chronic unilateral nephritis without pain and hematuria. It is certain that results of surgical intervention are often excellent in unilateral acute or chronic nephritis, but it is indispensable to state clearly the indications and contraindications and select cases amenable to operation. For the time being, we are unable to answer this question because many of the published accounts are incomplete from a medical point of view. I am convinced, however, that this gap will soon be filled."

This paper is based upon the bacteriological examinations of the urine made in cases of kidney ptosis only. It does not include results from the urine of patients with general enteroptosis. The acute kidney infections, the pus kidney and the tuberculous infections are not considered, nor any case of ureter stricture.

The acute infections of the kidney are mostly associated with general systemic involvements. Where resistance is low or the virulence great, the breaking down of the parenchyma takes place and the "pus" kidney develops. Otherwise the process subsides, responding more or less promptly to therapeutic measures. Any interference with the urine escape favors chronicity and the pathology becomes resistant to medication. In a tuberculosis of the organ a very different process exists which places the condition in a class by itself even if a kidney ptosis is associated.

Outside of the "unilateral nephritis" so-called, the movable kidney has always been treated with little individual consideration of the various phenomena found. The kidney truly giving trouble was not distinguished from the latent case so that at the present time a diagnosis of this particular pathology is accepted by the profession with mistrust.

Thus we have been dealing with the question from the gross statistic viewpoint and overlooking the significance of individual findings.

"It is less than ten years," says Mayo, "since nephrorrhaphy, ventrofixation, gastrorrhaphy, and kindred operations were resorted to on indications which would not be accepted to-day. We have come to appreciate the fact that comparatively few of the abdominal viscera have unchangeable anatomic characteristics and that variations within limits are not to be considered abnormal."

This is the usual method of disposing of the movable kidney, yet when kidney ptosis is considered from a more specific point of view, it is essential to find some basis for determining and classifying those cases that are of pathological significance.

Justification exists for a grouping of these cases into four types. The first type is the class of cases written of as "unilateral nephritis." These are practically all right-sided. The kidney is low, easily palpable, tender to the touch and somewhat enlarged. There is bladder irritability, but inspection reveals nothing but possibly a congested mucous membrane, with a reddening of the right ureter orifice. The urine shows some albumin and pus, a few casts and numerous bacteria, but these findings vary from day to day. The patient complains of a dragging feeling with dull pain in the right

lumbar and hypochondriac regions. There is tenderness and occasionally pain over the spinal exits of the lumbar vertebræ. These cases seldom exhibit Dietl's crises, but are often associated with periodical uremic attacks evidenced by headache, fever, puffiness of the face, and lessening of the urine output.

The classification of this pathology as a "unilateral nephritis" is not technically correct for the term nephritis is too intimately associated with Bright's disease to convey any other impression. Such cases are invariably germ involvements of the kidney pelvis, and what changes take place in the kidney parenchyema are wholly secondary to the infection.

Into the second class of kidney ptosis cases may be placed those that give definite Dietl's crises. These attacks of pain most frequently come if the patient suddenly assumes the standing posture. They are accompanied by faintness and occasionally a variation in urine secretion, not only as to quantity but also in chemical and microscopical findings. The symptoms are relieved by the recumbent posture and the attack may be followed by a tenderness of the kidney, persisting for a few hours. During the interval the urine may exhibit absolutely no abnormal changes. There are occasional cases that must come under this heading where the pain is not present, but a sudden fainting is the primary symptom. It may be that these patients are extremely susceptible to pain and that the complete unconsciousness is the result of the pain stimulus, but that symptom is forgotten. The suggestion of Dr. R. A. Archibald that anaphylaxis may enter largely into this type of uremic attack is of interest.

Anaphylaxis, or allergy, as Von Pirquet terms it, depends on periodic proteid splitting, the absorption of these split products giving rise to definite clinical symptoms peculiar to the type of proteid present, but necessarily these periods of abnormality must be separated by a considerable interval of normal metabolism. It is reasonable to suppose that in a patient with free urine drainage which suddenly becomes disturbed, the chemical changes taking place can readily cause marked disturbance. The two patients that I have seen with this type of attack have had more marked urine changes and more prolonged uremic symptoms than those patients with classical crises. Since the ptosis was corrected, these patients have had no recurrence of their fainting spells. These two groups are well-recognized pathological entities.

Under the third group should come the cases that might be said to be of questionable etiological importance. It is of this class

of cases of which Strumpell says: "In a great majority of cases of floating kidney we have to do with those familiar and frequent conditions of a nervous character which are termed hysteria or neurasthenia. It is not always advisable to apprise the patient of the fact, for with a person of this sort the mere idea of possessing a 'floating kidney' is enough to stir up a host of subjective symptoms—unless you wish to use it for suggestive therapeutics." And Osler states: "Far too much attention is given to the condition which is often associated with neurasthenia."

The kidney is readily palpable, the left almost as frequently as the right. The organ may not necessarily be tender and usually is only slightly enlarged. The patient complains of sideache and some backache with occasional irritability of the bladder. The nervous symptoms are often marked and of almost any type. If the right kidney is the one at fault, digestive disturbances are present due to the close relation of the cecum and kidney.

The examination of the bladder is usually negative, the urine may show absolutely no changes, except from the bacteriological side; but, if the germ present is in excess, a trace of albumin and a few casts are found. In these cases, as well as in the "unilateral nephritis" type, the urine will escape from the catheter without the normal rhythm. This continuous drop flow has been counted by some men as being diagnostic of the presence of the catheter within the kidney pelvis. The character of the flow is only indicative of the catheter having reached a dilated portion of the ureter or that the peristaltic contraction of the kidney pelvis and ureter is disturbed. The results of the bacteriological examination of the urine are in this type of case of most significance as an aid to diagnosis.

Under the fourth head are classified the patients with kidney ptosis in whom no symptoms can be found traceable to the condition and who show on urine examination a relatively sterile urine. I say relatively sterile urine because only a small per cent. of specimens are absolutely free of germs. Out of one hundred and twenty-five examinations made in the type of case under consideration there were only three specimens absolutely sterile.

With the hope of getting determinations of greater value from a clinical standpoint, we have with the last sixty-five cases of kidney ptosis, plated a cubic centimeter of urine and counted the number of colonies developing in twenty-four hours. Out of the one hundred and twenty-two examinations in which growths were obtained, twenty-six patients that could not at the time be considered as suffering from the effects of the kidney displacement, gave after this

method twenty or less colonies per cubic centimeter in thirty-two examinations.

In the sixty-five patients investigated, there were five suffering with definite crises, two with marked associated uremic symptoms. In two of these cases, one with uremic symptoms, the urine had never more than twenty colonies to the centimeter even following a marked attack and the urine was without variation in the two kidneys. The other two individuals had more definite local kidney symptoms and the urine upon culture gave counts varying from two hundred and ninety-four germs per cubic centimeter upward to an uncountable number. After operation on these two patients to correct the kidney displacement, the count dropped to below twenty per cubic centimeter, and has remained so consistently for over six months associated with perfect general health.

Four cases of unilateral nephritis of the right kidney have been carefully investigated. Two have been cured by operation, two improved by corsets and treatment. Cystoscopic examination in each case showed negative bladder findings except for some congestion of the orifice of the right ureter. The kidney function was not impaired; the quantity secreted by the separate kidneys was not equal. In three cases the larger quantity came from the abnormal side, but of decreased specific gravity. On this side also there was no rhythm to the discharge. The bacteriological count differed in each kidney, the number on the right side being uncountable. On the left not over four hundred appeared in any examination. In all cases there was a mixed infection. Careful guinea-pig inoculations gave no evidence of tuberculosis.

The character of any kidney infection will depend on the primary location, the type and virulence of the germ, and the patient's resistance. A severe involvement in the parenchyma will lead to abscess formation and kidney destruction. Rosenow's findings that the selective tendency of germs depend on the type of virulence may possibly account for either a parenchyma or a kidney pelvis involvement.

Tuberculosis of the kidney must be considered in a different class from these other infections of the kidney pelvis. The tuberculous and the pus kidney are not curable by fixation and are treated by incision or removal.

The unilateral nephritis is essentially a kidney pelvis condition with a certain amount of parenchyma congestion as a sequela. It is devoid of the systemic and blood signs of an acute septic condition. It is invariably imposed upon a displaced kidney and the condition promptly responds to operative replacement of the organ that per-

mits improved drainage. When treated by corset support and therapeutic measures, improvement takes place, but there is a tendency to recurrence of the more acute symptoms.

The corset support promptly decreases the bacterial count to a marked degree, but during the exacerbations the increase is again rapid. A woman of sixty-five, whose attack occurred a year ago following the grippe, had on the diseased right side an uncountable number of germs, but on the left side four hundred and thirty-two to the cubic centimeter. The corset correction reduced the count on both sides to less than half the number. In two other nonoperated cases the results were even more marked.

In the two cases operated upon the bacteria practically disappeared from the urine within a few months, the decrease being uniform and rapid. The symptoms were relieved immediately; the patients promptly gained in weight and had no recurrence of the uremic signs.

Patients with unilateral nephritis always show the presence of a considerable number of bacteria in the urine from the supposedly normal side. Yet in the urine of this side the decrease of bacteria takes place much more rapidly following surgical treatment or corset correction of the abnormal kidney.

The findings in the class of cases listed as of questionable etiology were also well marked. Six of these patients had had pelvic operative work done, but with slight improvement. The kidneys had been overlooked because of the lack of marked definite symptoms. The number of bacteria in the urine never reached the amount found in the "unilateral" type, but corset correction always produced a marked decrease—with a prompt increase if omitted. With the lessening of the germ the symptoms disappeared to reoccur when the count again increased.

The factor at fault is without doubt poor drainage, which through chemical changes produces a suitable culture medium for germ increase. The number of bacteria is then relatively an indication of the degree of stasis.

If we can eliminate the cases that have a bacterial count, depending upon a bladder involvement that is the result of bladder ptosis, or upon pelvic inflammation, in a patient with kidney ptosis, we have an index in a measure of the disturbance the condition produces. The type of germ found seems to be of little importance, probably due to the resistance of these mucous membranes to infection.

The varieties will vary in the same individual from time to time and as a rule a pure culture is seldom present. The resistance of

some bacteria to plate culture will offer some element of inaccuracy and necessitate a tube growth for checking, especially in cases severe enough for vaccine therapy.

The taking by the patient of any hexamethylenamine compound as a urinary antiseptic has a marked influence upon the count, even though free formaldehyde is not present in the urine.

The results obtained so far from the bacteriological examinations in these cases seem to justify the conclusion that urine containing a relatively small number of germs may be considered normal. In individual cases the results have been so uniform that it proves we have practically eliminated urethral contamination. In seemingly normal individuals a perfectly sterile urine is rare, and this must emphasize the fact that bacteria are being constantly eliminated by the kidneys. Taken in conjunction with the experimental inoculations and the occurrence of germs in the urine in systemic infections, it is essential to acknowledge a germ secreting function to the kidney. This factor necessarily increases the importance of the presence of a kidney ptosis that may interfere with drainage.

We are too prone to accept too fully the advice of the men who have vast experience and publish extensive statistics. We forget that it is the individual we treat and not the disease and that what with one individual may be pathology of little moment to another of more sensitive disposition may be vital.

With the kidney ptosis of no matter what degree, the question of its bearing on the patient's health is one of individual determination and usually by careful investigation and proper therapeutic measures, its importance can be determined before operative measures are instituted.

The amount of trouble from the ptosis depends more upon the interference with the urine flow and the amount of stasis produced than upon the particular location of the organ.

The stasis alone may result in symptoms of a uremic character, but from the kind of infection imposed will depend the degree of general pathological disturbance.

The sensitiveness of the patient to defective physiology has a great influence upon the degree of stasis and the amount of infection necessary to give rise to symptoms essentially pathologic.

If the peristaltic action of the kidney pelvis and the ureter is perfect (unless an acute obstruction occurs as indicated by crises) the ptosis can be accepted as one not requiring correction, but we must realize that in every such individual the foundation for future trouble is present.

APPENDICITIS AS A CAUSE OF CECAL STASIS.

BY

HUGO O. PANTZER, M. D., A. M., F. A. C. S.

Indianapolis, Ind.

SYNOPSIS.—Nearly every case of appendicitis is chronic when recognized clinically. Many cases of appendicitis of long standing run without characteristic or striking clinical symptoms. Anatomical findings: Pericecal membranes are a common accompaniment of appendicitis of cecal stasis. Interdependence of both conditions. Cecum mobile of Wilms, so designated, is in most instances not a congenital condition, but is due to chronic appendicitis resulting in contraction of the posterior cecal wall, and prolapse and bulging of the anterior cecal wall. Inter-relation of latter condition, and floating kidney and duodenal stasis. Simple and full transverse division of pericecal and ileal membranes necessary to a cure. Colon surgery (short-circuiting operations) unnecessary. Ante-operative and post-operative treatment. Results.

Modern medical literature is impressively clear and convincing in attributing to imperfect evacuation of the colon and the proximal ileum an intoxication having a blighting effect upon all organs of the body. The numerous essays upon this subject, as yet, vary in their different conception of the etiology of this stasis, the construction of its evil effects, and the method of treatment employed. This state calls for futher elucidation.

Different parts of the intestinal tract may be the seat of the stasis. It is important to find in each case the particular locality involved. The acute stasis as observed in cases of acute general sepsis, and as occurs in cases of localized abdominal infection whereby certain parts of the intestinal tract are fixed and obstructive lesion follows, and as supervenes in diffuse peritonitis accompanied with general distention and agglutination of intestines, has long been recognized and duly accounted. But the insidious effects of circumscribed subacute infections, and localized mechanical hindrances to intestinal movement, have been relatively little studied in their variable pathogenic and clinical manifestations.

The object of this paper is to emphasize the stasis resulting from appendicitis; and more particularly to call attention to a subacute form of appendicitis, which, though it does not give rise to striking clinical symptoms calling for an immediate operation, is because of its frequency and baneful effects of serious importance. Commonly these cases go without recognition. Practically every case of appendicitis "cured" by medicines, and many cases that have been operated upon without attention having been given to pericecal membranes, afterward suffer from intestinal stasis.

As early as 1890, Eulenberg published his painstaking research into the pathohistology of appendicitis, which clearly revealed that appendicitis is essentially a subacute or chronic inflammatory disease; that it commonly has a subacute beginning without obstructive clinical symptoms; and that the acute symptoms manifesting it clinically, are but a critical phase of a long-standing disease. In the years that have since gone by, but little has been added to this conception of the disease, and nothing to contrafute it, although but few men have given to this statement its commensurate consideration. This conception of the pathology alone, by *a priori* reasoning, should lead us to expect that an inflammatory involvement of the various layers of the appendix will by direct contact involve adjacent organs; and that the rich lymphatic structures of the appendix will carry through their lymph channels the infection to other organs, such as the mesentery, cecum, ileum, kidney and liver. Pyelitis and cholecystitis, as etiologically associated with *acute* appendicitis, have long been recognized clinically, but their development from subacute and chronic appendicitis and from the stasis of pericecal membranes is yet insufficiently considered.

The writer has many years methodically looked for and treated these periappendiceal changes. In this practice he precedes many whose names are now prominently connected with anatomical findings and surgical procedures. Upon such experience it may here be said that an appendicitis, which at the operation does not show gross evidences of chronic periappendiceal involvement, is relatively rare. Even cases owing to exanthematous diseases—where the acute appendicitis indicates the primary eruption upon a mucous membrane which appears upon the skin a little later, as in small-pox typhoid fever or scarlatina—the anatomical sequelæ of subacute or chronic appendicitis are commonly found.

The causative and interchanging relation that these anatomical bands and membranes and their sequential angulation and distortion of the bowels have upon stasis, and, inversely, what bearing stasis by

low grade of osmotic infection and toxic inflammation has upon producing the former, need not here be considered. They are set forth sufficiently in the recent profuse literature. For the same reason the contention over what should be regarded as essentially a congenital band, as contrasted with an adventitious formation, may be omitted. It is sufficient to recognize that where congenital, prenatal and postnatal formations disturb intestinal function, they are *conditions demanding treatment.* Those who do not find these anatomical changes, or discover them rarely, fail simply for want of thorough search. The phenomena of intestinal stasis, or as stated comprehensively, the symptoms indicative of a *systemic intoxication,* require no restatement here. However, it shall be regarded imperative that their presence in a given case should, invariably, lead to a thorough search for the active cause or causes, such as intestinal stasis, suppurative tonsilitis, dental decay, tuberculosis, chronic malaria, etc.

The signs and symptoms of special significance in the diagnosis of chronic subacute appendicitis shall here be given.

Constipation is an almost invariable symptom. It must be clearly understood that a single daily movement, as bona fide evidence that constipation does not prevail, is incorrect. A single daily movement indicates commonly only the discharge of the lowermost part of a more or less extended fecal column. In some instances intermittent attacks of diarrhea are associated with this form of coprostasis. They must be regarded as nature's attempt to remedy the constipation. In other words, an intermittent diarrhea rather points to the existence of constipation. Rectal touch and exterior abdominal palpation will reveal the impacted condition of the great bowel; and the large masses moved by the administration of cathartics makes proof final.

Colic, in the ileo-cecal region of transient duration, commonly of mild degree, is present in most of these cases. The long time sufferance of this colic has often created a tolerance for it by which the patient fails to consciously note it. But the patient who denies its occurrence to the direct question, will often report later that not only has he observed it since his attention has been called to it, but that now he recalls its previous occurrence.

Abdominal touch. Pray let it be the delicate touch employed by the blind man in substituting his lost vision, not the forceful physical contact as ordinarily inflicted, by which the tactile sense is blunted! I repeat, abdominal touch in these cases easily reveals the deformed, distorted and dislodged cecum. Gentle palpation,

avoiding contraction of the underlying parietal musculature, may reveal the outline of the cecum, its often thickened and increasedly resistant wall, and its variable contents of fluid, or of impacted or mushy masses. Many cases show the cecum to extend as low as Poupart's ligament. At times it is narrow, thickened and resistant, banana-like in form, extending along the outer wall of the abdomen; again, it may differ in contour according to the formation and incursion by bands, or membranes, covering part or all of the cecum. In other cases the low cecum is readily recognized as a wide organ; it may reach to and beyond the median line; it may be fixed; it may be freely movable and easily shoved inward or upward; or it may be found high up, compressed, thickened and resistant.

In many cases where the cecum extends low there is palpable tenderness and constriction of the cecum at McBurney's point. There is also tenderness, associated with muscular rigidity, in the lumbar region. This tenderness may be elicited upon gentle pressure, which reveals the presence of a mild degree of rigidity in the overlying musculature, rather than by the subjective symptoms of tenderness and pain. Tenderness and rigidity in the lumbar region commonly indicate an appendix in high retrocecal location, and may be associated with longitudinal contraction of the posterior wall, and prolapse of the anterior wall of the cecum. At the operation the mesenteriolum is often found contracted into a hard scar band; the appendix is drawn upward and behind the cecum, where it is plastered down or even hidden in a cecal fold. When this is the case it presents various conditions of contraction, thickening, angulation, dilatation, or stenosis. An extensive region may become involved in this cicatricial contraction and membranous hooding-in; and, as a consequence, there is marked shortening of the posterior cecal and colic wall, and distortion, displacement and angulation of the adjacent ileum. Ultimately there is produced what must be regarded a compensatory dilatation bulging and lengthening of the anterior cecal wall. By this deformity the circular fibers of the intestine suffer great disarrangement. The posterior muscular structures become bunched and contracted, while the corresponding anterior musculature stretches greatly and retains no longer the normal apposite relation to its fellow posterior segment. This state, combined with the influx of the heavy fluid contents from the small bowel, naturally produces an abnormal anatomic state. This condition is easily mistaken for a *cecum mobile* of Wilms. It is very important the two be not confounded. The *cecum mobile* of Wilms, as a congenital condition, is relatively rare;

while the protuberant and elongated anterior cecal wall, resembling it, is of common occurrence.

The thorough division of the adventitious membranes and contracting scars releases the cecum and ascending colon fully, and it is then easily differentiated from the ptotic cecum of Wilms. Later, palpatory evidence, even during the short time the patient remains at the hospital, will reveal a notable retraction of the cecum, *i.e.*, of the anterior wall of the cecum. The valuable aid in diagnosis by radiography needs no mentioning here. Palpatory findings are here dwelt upon as being immediately available and, at least, relatively reliable.

Another observation of great collateral interest ought to be noted. In cases where the right kidney was found low and floating, and giving rise to characteristic symptoms, after releasing these bands and membranes, the kidney is commonly found ascended, and the relative symptoms have vanished. This observation touches upon Edebohl's findings of many years ago; namely, that floating kidney and appendicitis are usually associated. While Edebohls placed stress upon the kidney as the primary causative factor, it seems more reasonable to regard chronic appendicitis as the main etiologic element in this condition. Of vital relation to this subject is the recent addition to our knowledge of the anatomy of the kidney by out esteemed fellow, Dr. Longyear. The fibrous teniæ of the cecum, in their continuation upward on the posterior surface of the cecum and ascending colon, constitute the nephrocolic ligament of Longyear. This reaches up to the lower pole of the kidney. At this point the nephrocolic ligament divides into its component strings, which, like the ropes of a balloon, support the perirenal fat.

The contraction of the posterior cecal and colic wall, following this form of retrocecal appendicitis, eventually affects and shortens the nephrocolic ligament and causes displacement and distress of the kidney. Likewise the accompanying distortion and upward displacement of the appendiceal and adjoining ileal mesentery disarrange the relation of the ileum to the cecum and ileo-cecal valve. The anatomical relation these various parts and organs hold to the duodenum effects an angulation, distortion and obstructive interference with the emptying of the duodenum. As a matter of fact, it has often been observed that nephropexy has given relief to duodenal stress. In my observation, the extensive surgical division of post-cecal contractions and membranes has frequently given full relief from the duodenal symptoms.

With the incident distortion of the adjoining ileal loop, this loop is often found tender. The forced efforts, necessary to propel its contents through a constricted kinked lumen, account for this; and careful palpation reveals this ileal tenderness.

The cecum can also be mapped out positively by lightest *palpatory percussion*. The sameness of resonance may be construed to signify one continuous organ. In going beyond the cecum, this manipulation will reveal variations in the resonant note, as, for instance, it becomes higher when a small intestinal loop is covered by the percussed and palpating finger.

If now the lateral abdomen is gently compressed with the left hand, by the thumb in front and the fingers behind at a point above the ileum, while the right hand makes pressure upon the lower cecum, this part cannot only be mapped out quite distinctly but, by the sensation of the bowel contents moving upward under the fingers of the left hand, this can be definitely recognized as being the cecum. In other words, the bowel felt below the compressing right hand, may be looked upon with certainty as being the prolonged cecum. These various findings lose their early problematic reading when, time after time and with only occasional erring, the subsequent operation has shown the actual anatomical condition to tally with the previous palpatory reading.

Oral temperature, in these cases, is ordinarily subnormal; whereas the *rectal* temperature frequently records over 99° F. At times, when there is subacute infection or an acute exacerbation of even a very circumscribed process within the appendix or cecum, the rectum will show one or more degrees above 99, while the oral temperature is normal or below the normal.

That disease of the cecum calls out a rectal reflex has long been known, and, as in ileocecal intussusception, rectal tenesmus is almost constantly present. In concourse manner these cases of ileal cecal stasis will commonly reveal concomitant *rectal stasis*, even where there is no local (rectal) cause for constipation. Another evidence of chronic cecal stasis is the difficulty often observed of clearing the cecum. Notwithstanding cathartics, followed by copious enemata, the cecal impaction persists more or less. Attacks of general acute malaise with muscular pains, anorexia, coated tongue and tenderness in the region of the cecum, are frequently attendant upon such efforts at evacuation. The feces during these attacks often contain mucus; sometimes, but rarely; blood, and have a very foul odor. Most characteristic of this condition are little hard fecal plates of off-color. They represent scybala that have been

closely adherent to the bowel walls for a long time. By the side of these, softer feces may have passed for days and weeks without dislodging the former. A moderate elevation of the rectal temperature may be observed, synchronously, with their discharge. At the operation these hardened scybala can be found firmly attached to the interior of the scalloped parts of the cecum. It is hard or it may be impossible to separate them from the bowel wall without undue force. After the operation, and under catharsis when such scybala are being passed, the systemic symptoms above mentioned can be regularly observed; thus the relation of one to the other is proven.

Most of these patients may be found a long time at their regular vocation totally unconscious of the insidious depreciation of their vitality and strength. But their listlessness, nervousness, lack of vigor and endurance are apparent. The efficiency of such individuals is often reduced 25 to 50 per cent. and more. Their invalidism may lead them to abandon their usual occupation, and predispose them to intercurrent disease. This class of patients gives us our fatalities, or slow recoveries through acute infectious disease, or through insults attending the operation. The sum total of chronic toxemic patients is legion, and a large per cent. is due to intestinal stasis.

The anatomical and symptomatic diagnosis of chronic subacute appendicitis should lead to operative relief as quickly, as is practised in the case of so-called acute appendicitis. In advanced cases an immediate operation may be fraught with evil. The psychical and physical shock of an operation and the toxic effect of the general narcosis, may result disastrously in further invalidizing the patient by retarding recovery or, possibly, by an immediate fatal termination of the case. It is here good judgment should be used. When the skin is dry and shrunken, the urine of low specific gravity, the liver small and shriveled secreting bile that fails to color the stool, and when there are other nervous and physical phenomena indicative of greatly depreciated functional activity in various organs an operation is out of the question! It is now that the medical, dietetic and hygienic treatment, which must be an obligatory feature of the case for a year and longer, is the proper procedure. Let it be understood that the blighting effect of this stasis is essentially *glandular* in character. Both the excretory and the secretory organs are primarily involved. Their restitution, it may be said, is the object of all treatment.

Treatment.—A daily (preferably at night) warm bath, including

thorough soap-massage and forceful crash-towel drying; the free imbibition of fluids; bulky, largely vegetable diet; daily moderate exercise; prolonged periods of rest, from twelve to eighteen hours daily; warm clothing by day and extra warm covers when lying down; cheerful environment; various sodium salts given alternately and taken in large quantities of hot water; phenolphthalein, podophyllin, and aloin in doses sufficient to produce three to four bowel movements daily; and, last but not least, a constant medical supervision will suggest the steps to be pursued not only in preparing the patient for an operation, but also for a long period after an operation.

The physician's duty in these cases is most trying. These patients are inherently laggards; they have no carrying strength of their own. Their lack of force, for the time, has to be supplanted by that of the physician and nurse. Only when the latter render earnest, capable, and persistent efforts, can results be accomplished. The many failures before an operation, through an operation, after an operation, and without an operation, attest that the medical treatment outlined above is not adequately enforced. Even in seemingly hopeless cases, remarkable and permanent results may be obtained. These patients are the most grateful we have. They realize the importance of the strict discipline to which they were subjected. Their restoration to health is an ever conscious perception.

Operation.—All of the above described varieties of appendicitis operated upon away from an acute stage, must be attacked through an abdominal incision of sufficient length for full exposure of the field to answer all purposes. The simple transverse division of bands and membranes, wherever they constrict or abnormally tie down the bowel in all its layers, though they be many, should be done with thoroughness and largely by instrumental touch. More than simple division of the membranes or bands from the underlying bowel is not necessary, except in rare cases. After this treatment the cecum and ilium should be held in natural apposition without constriction or strain. The ileum shall feed into the cecum from the left at right angle as is natural. The cicatricial tissue, of which these adventitious structures consist, has the character to retract upon itself. Nature here accomplishes without complication what the less delicate hand of the surgeon cannot do. Reformation of these bands and membranes is rare. When they do reform, or adhesions take place, it must be attributed to unnecessary manipulation, or an infection at the time of the operation, or to subsequent stasis and reinfection.

It is a fact, daily observed at operations, that these membranes and bands find scant consideration and treatment by most operators. It stands to reason, therefore, that naught but a complete division of these bands and membranes can prevent the repetition of stasis. Judicious and skilled handling will not entail traumatism and infection and hence there will be no recurrence of bands and membranes. Subsequent wary treatment of these cases is an essential too often woefully slighted.

Here are some of the results obtained: Urine of the specific gravity of 1002, has come up to 1015 and 1018; the light yellow and even clay-colored stools, have gradually come back to their proper brown; a liver, measuring 2 inches in the axillary line, has resumed its normal scope; the skin, a stranger to perspiration for years, assumes a natural moisture; desk work, discontinued for years, has been resumed; a dulled intellect has brightened to old-time vivacity; and the always present lassitude and lack of endurance, have yielded to former vigor and endurance.

The fact that the writer has been lying low for a case indicating a short-circuiting operation, and found none, may be taken as an indication of the strength of his convictions.

DISCUSSION.

Dr. David Hadden, Oakland, California.—In connection with Dr. Pantzer's paper, it might be of interest to mention that the three cases of unilateral nephritis reported in my paper had had their appendices removed. The relation between the cecal stasis and the kidney ptosis was shown nicely in some cases that I investigated from the bacteriological side. In these cases the appendix had been removed, but the kidney not fixed yet the bacteria in the urine decreased rapidly with the improvement in the patient's general condition.

LONGITUDINAL INVERSION OF THE COLON; A TECHNICAL STEP IN THE SHORT-CIRCUITING OPERATION.

BY

ROBERT T. MORRIS, M. D.,

Professor of Surgery, New York Post-Graduate Medical School,

New York City.

(With two illustrations.)

At a time when we were making new progress with appendicitis, the tendency was to devote so much attention to detail that the patient was forgotten. Now, with our new colonic work, there is in some quarters a similar tendency to do wôrk that is too severe. With this feeling in mind I have tried to develop the idea of simplifying the technic in selected cases in which a simplified method would be applicable.

The procedure was begun with redundant sigmoid cases in which we had to deal with this fairly common condition. After making anastomosis for short-circuiting, instead of cutting out superfluous sigmoid it seemed to me we might lessen the degree of traumatism by painting this bowel longitudinally with iodin, and then running a suture in such a way that when it was drawn it would bury the painted part longitudinally. This transformed the redundant part into a narrow "rope," and dependence was placed upon the iodin for causing strong adhesion. It may be done rather quickly and disposes of the redundant part with less traumatism than that belonging to excision methods.

The first step was taken when we all tried to prevent reverse peristalsis after the ordinary short-circuit operation. At that time I angulated ileum distally from the point of anastomosis with the rectum, and angulated sigmoid proximally from the point of anastomosis. After making the anastomosis, I had tried by means of such angulation to inhibit reverse peristalsis and succeeded fairly well in some cases. The next idea was that of plaiting the sigmoid, carrying out the principle of longitudinal inversion of 2 or 3 inches of the bowel above the point of anastomosis, for the purpose of stiffening and narrowing the bowel but allowing space enough so that the normal colon could force its fluid contents past this stiffened narrow part of the sigmoid. Fluid con-

tents were little more than mucus, because the ileal angulation shunted the chief bowel contents into the anastomosis opening at the short-circuit site. This stiffening of part of the sigmoid seemed to be a fairly effective method. Then I continued the idea to apply to more or less of the colon, and in one case practically disposed of the

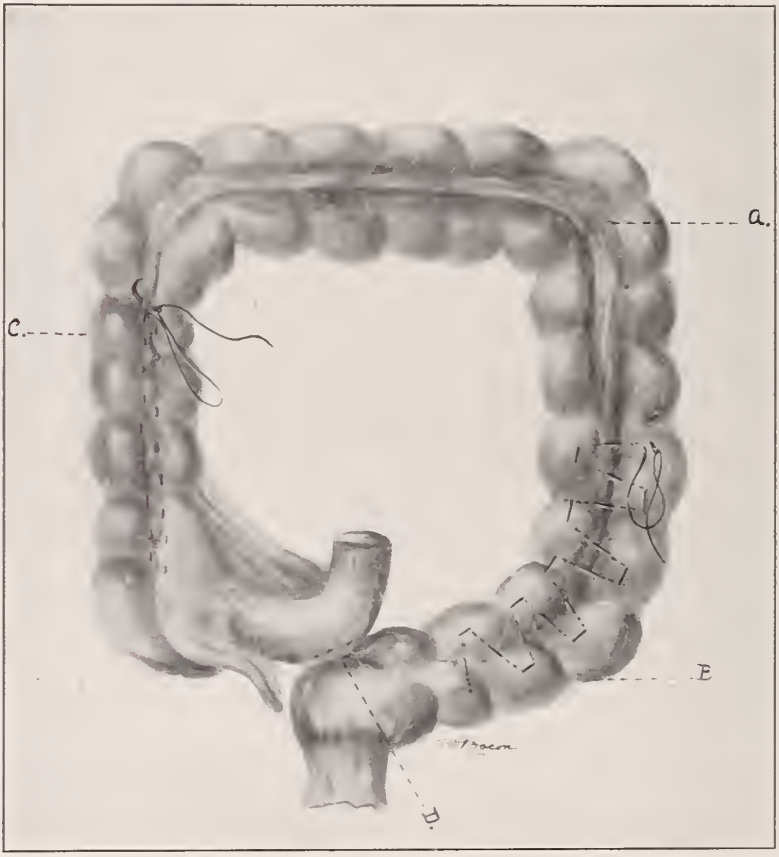


FIG. 1.—A. Central shaded part indicates area brushed with tincture of iodine for increasing adhesion of apposed peritoneal surfaces. B. Part of bowel showing first layer of mattress suture. C. Another part of bowel showing showing first layer of mattress suture closed. This would be followed by the "accordeon suture", depending upon the requirements in any given case. No two cases alike. D. Ileo-sigmoid anastomosis.

entire colon above the point of anastomosis by longitudinal inversion of its wall. If you wish to dispose of most of the colon for the purpose of avoiding the operation of colectomy, in selected cases without too fat an omentum, introduce the suture at this point

(indicating), make it in mattress form but carry it up a little obliquely, and then add what I call "the accordion stitch." Before the mattress suture is tightened we first dry the bowel, then paint it longitudinally with iodin, and rapidly introduce the linen stitch running the finger just ahead of it to double in the bowel wall as we go. That not only causes longitudinal inversion of the bowel wall and disposes of most of the colon but it also shortens the colon. The accordion form of stitch may be made to shorten the colon still more, and disposes of most of the lumen, yet leaving room for the secretions of the colon to escape. Very little room is required for the passage of mucus and

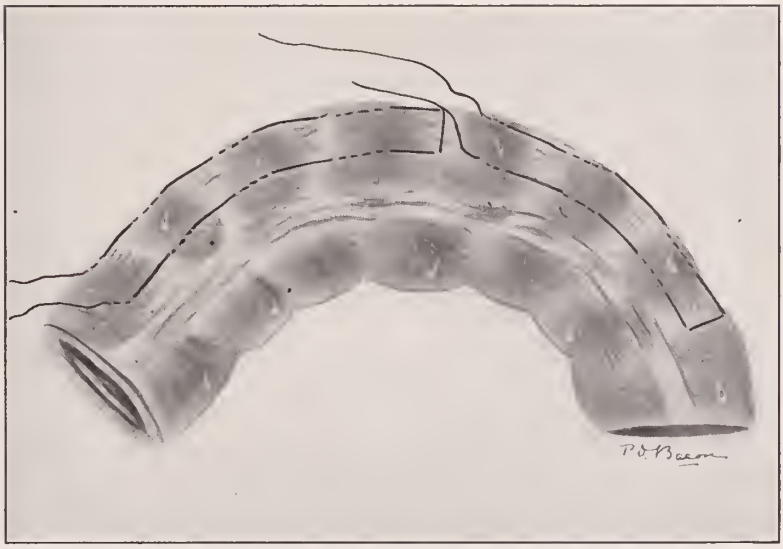


FIG. 2.—Accordeon suture, for still further reducing the lumen of the colon, after introduction of one or more layers of mattress suture.

gas and we avoid in that way the adhesion complications and shock which follow colectomy in some cases.

Occasionally in cases of colectomy the shock is excessive, and the idea here by this new step, which is still in the experimental stage, is to do away with the severity of the operation of colectomy. In cases with large epiploic appendages these may be cut out at times, but in adipose patients they will interfere so that I presume the operation cannot be done. In cases with fat, heavy omentum, this structure will interfere because attachments of the omentum along the transverse colon are so high up on the colon wall that the anterior layer of omentum engages the line of suture, interfering with satis-

factory longitudinal inversion of the colon. If the fat is not too thick we may sever the anterior layers of omental peritoneum, get a good grasp of the bowel in our suture and subsequently run a simple suture to carry back the cut layer of the omentum, to its place along the colon.

This work is still to be held *sub judice*. I have done the operation in only three cases and not completely in two of them. I developed this technic very recently and intended doing more before reporting, but on account of being absent from work during the summer, have not developed several points which will be taken up this winter in connection with the technic. The outline report is made at this time in order to allow some of the members of the Association to apply the principle in their practice.

PLASTIC OPERATION FOR CORRECTION OF CECOCOLON STASIS.

BY

EMERY MARVEL, M. D., F. A. C. S.,
Atlantic City, N. J.

(With three illustrations.)

EXPERTS declare that if complete combustion could be attained, not only would the nuisance of smoke and the inconvenience of ashes be eliminated, but the amount of energy would be doubled. It is likewise evident that if digestion were perfect and absorption complete, there would be no residue of ingested material in the intestinal tract. Were this to avail the individual could be spared considerable inconvenience, saved much distress, and would be free from various conditions that impose discomfort and menace health. What does prevail is that much of the food intake is only imperfectly digested with comparatively small amount of absorption, and there remains much material to be carried off through the outlet of the intestinal tract. For this elimination nature has provided, which provision is adequate when the machinery is properly constructed and remains in a healthy working condition. When, however, the parts which perform this function are improperly constructed and by that deformity, or by existing malposition of these parts the onward and outward course of this waste material is unduly delayed the organism suffers. This material has experienced and is still capable of further experiencing various chemical changes; all of which are not beneficial, and some of which are distinctly deleterious to the individual in whom their products are present. This material possesses also favorable elements and conditions that are suitable for the propagation of bacteria. The entrance into the circulation of these organisms, or the absorption of their products, becomes a menace to health.

The anatomical structures to be reckoned with in considering fecal stasis are the respective portions of the small bowel and sections of the colon. In so much as the material in its course through the small bowel is liquid, impairment to its progress in this department is rare. Emptying itself as it does from the small caliber of the ileum into the larger cecal basin, this material slows its current and stagnates. This stagnation is further favored when the cecum is

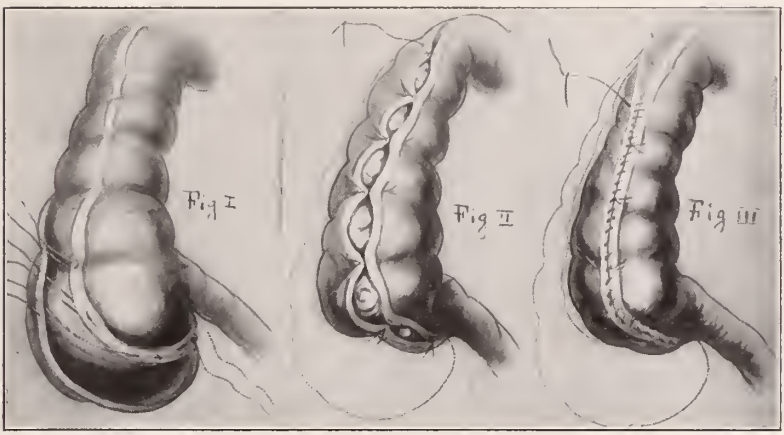
distended, whereby the volume accommodation is increased; gravity handicaps the upward and onward flow; and the propulsive force is lessened. It is this part of the intestinal tract that most favors stasis and becomes the most frequent offender in establishing and maintaining this pathology. In so much as the condition causing the stasis is physical and by its own existence the condition is self-perpetuating and progressive in order to find the remedy one needs to correct its cause. The cause is physical and invites physical correction. Such correction must have for its object the reduction of the retention cavity and a means that favors a speedier moving-on of the contents.

A simple method suggested itself to me some months ago when I was confronted with a greatly overdistended cecum and colon exhibited during operation. It was in a patient upon whom I was correcting a uterine retrodisplacement and removing a chronic diseased appendix. This patient gave the history of the stasis syndrome covering a period of over eight years and was viewed as a chronic "complainer". Her distress had been increased after childbirth by the superimposed dragging of the uterus, but her stasis syndrome antedated the pregnancy. The fulness, distress, and aching in the right lower quadrant was pronounced; and, with these symptoms were the cold moisture of the surface, anorexia, nervousness and weakness. During the operation the cecum presented as a ballooned pouch involving most of the ascending colon. The sac expanded below the ileocolic juncture and was of sufficient dimensions to accommodate approximately a pint volume. The anterior *tenia coli* was correspondingly elongated.

I observed that the portion of the wall lying between the anterior and the external bands was most generous in sharing the increased capacity. I tried to bring these bands together and was gratified at the evident reduction in the caliber of the colon by so doing. Then it was attempted to bring the cecum up and fix it out of the pelvis. This responded to a simple device by approximating the dependent portion of the anterior band with the external band at a position sufficiently high that when the points were fastened together the cecal sac disappeared. The method, a description of which is here subjoined, was then applied.

The operation aims to elevate the cecum and reduce the retention capacity of the ascending colon. It restricts the caliber of the colon and eliminates the cecal pouch. This is accomplished by approximating two of the three longitudinal fibrous bands which enter into the formation of the colon wall. The operation has to do with the external and the anterior bands which structures are brought to-

gether in such manner as to invaginate that part of the bowel lying between. The appendix having been removed and the stump invaginated and covered, the most dependent point in the anterior fibrous band is caught by a Lembert suture of nonabsorbable thread, which suture is carried sufficiently high for its attachment in the external band that when tightened the bottom of the cecum is brought to a level with the ileocecal juncture. Sufficient interrupted Lembert sutures are then placed to completely approximate these two bands in line of their course from their origin at the base of the appendix to the site of the first suture. Additional sutures of the same type are placed above the first suture to the point where the caliber of the colon ceases to be dilated or to the hepatic flexure. A continuous suture is then placed bringing the serosa over the interrupted suture and thereby reinforcing the approximation by an



additional line of union. This completes the operation upon the bowel. The concluding of the operation in the closing of the abdomen, as well as the entrance into the abdomen in beginning the operation, is accomplished by the method of those of recognized and proven efficiency which is preferred by the operator. The illustration diagrammatically shows by Fig. 1 the bowel before the application with the first, or guide suture in place. Fig. 2 shows the supporting interrupted sutures placed, with some of the sutures fastened. Fig. 3 shows the interrupted suture closed and the continuous suture approximating the serosa covering, over the interrupted sutures and forming the second line of union. It also shows the eliminating of the cecal sac and the reduction of the circumference of the colon.

The second case operated upon by us gave the history of a full-fledged stasis syndrome, markedly manifested in poor nutrition in addition to those symptoms manifest in the first case. Five months of rest and forced feeding together with massage and baths and supports had failed to benefit. This case exhibited a tremendous ballooned cecum, whose dimensions were more suggestive of stomach than cecum. Invagination by the method described placed within the cavity of the colon such a bulk as to give fear of occlusion, whereupon the resection of the ascending colon was made and the distal end of the ileum was anastomosed with the transverse colon. While this patient has improved and merited expression of delight in her betterment from the family and herself, her progress has not been as rapid as the first case. I am now convinced that the resection was not called for in this case and in view of my observation and my present conviction based thereupon, I should not resect the colon in a similar experience.

The third case had been treated for intestinal stasis in various degrees for twelve years. Her syndrome was the common one with the addition of a marked mental condition with suicidal mania. She was operated upon four weeks ago. Though markedly exhausted at the time of the operation, she sustained no untoward experiences from the operation and promptly and perfectly recovered from surgical intervention. It is too early to draw a positive conclusion from her to be considered as a cure.

Although this method involved the principle made use of by Joseph Blake and previously described by him, my utilizing it was spontaneous and without the knowledge of Blake's work at that time. While the details of the method I employed differ materially with those employed by Blake, I offer this contribution to support Blake's work rather than to call attention to a claim for originality. The operation is comparatively simple for the operator, promises to correct the local defect, sacrifices no structure, and conserves the function of the part inviting a minimum risk and inconvenience to the afflicted.

The number of cases are too few and the histories insufficient to draw conclusions. Nevertheless we believe the method sufficiently meritorious in its offering with the logical and feasible argument for efficiency to commend it for consideration. It is submitted and the members invited to accept it on probation.

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DISCUSSION.

Dr. Charles L. Bonifield, Cincinnati.—Some of the members will remember that I read a paper two years ago on this subject, and at the Atlantic City meeting of the American Medical Association I reported the results after two years' observation on some of the same patients.

There are two or three things I want to take up. In the first place, I have forgotten exactly how many of these operations I have done, but I think it is about eighteen, and in none of these have I found it necessary to remove the colon afterward, nor have I found symptoms on part of the colon especially troublesome. There are one or two cases that had, for the first few months, to take enemas to wash the colon out, but these symptoms soon subsided. To be absolutely frank, one patient about three months after I operated on her did have a considerable accumulation in the colon; I was out of the city at the time on account of my health, and one of my ambitious friends who I thought was exceedingly anxious to do something surgical for my patient, removed the colon. I feel sure that had I been at home and had given careful attention for a few days to this patient, the removal of her colon would not have been necessary.

I do not claim to have any special way of preventing the reflux of the contents of the bowel into the colon, but I have observed in practice one thing that Mr. Lane emphasizes as being important, and that is to make the attachment to the sigmoid at the lowest possible point. I regard this of great importance. The next point of importance, I believe, is to cut off the ileum at such a point that you may make the anastomosis without the slightest traction on the ileum. This is easily done, and leaves the ileum so that peristalsis take place without any difficulty whatever.

My experience leads me, to prefer the side to side anastomosis. Mr. Lane nearly always makes end to side anastomosis. I have done the end to side, but the side to side is easier. It is easier to bring the ileum over and attach it at the point I show you (indicating), the end being closed, and what little ileum there is below the point of attachment is folded in just as Dr. Morris so graphically described the folding of the transverse colon. In that way, there is no possible chance for any accumulation in the ileum below the anastomosis, and with this lateral anastomosis you are sure of the bowel remaining normal and healthy. The blood supply is not so apt to be interfered with.

The next point I want to make is that I appreciate the value of Dr. Pantzer's suggestion, and I believe it may be all right in certain cases, but that does not cover the ground. There are cases in which the dilated cecum is not the worst factor by any means. The first

case of this sort I ever had was one in which I opened the abdomen, fully intending to do some other plastic operation, stitch up the colon or something of that sort. I had no intention of doing a short-circuit operation, but when I lifted the transverse colon I found that if I had stretched it, it would have hung almost to the patient's knee. It was not dilated but elongated. Its caliber was lessened. In that case the caliber of the transverse colon was scarcely greater than that of the ileum, and its walls were very much thinned. To break up the adhesions around the cecum or make the cecum smaller, as Dr. Marvel has suggested, would not overcome that tremendous stretching and attenuation of the colon. So in that case I changed my mind. I was forced to short circuit because that was the only thing that offered any relief to my way of thinking.

I want to call attention again to the fact that the *x*-ray shows that it is not only in the cecum we have the stasis. If the pictures are taken four hours after the bismuth is taken, if you watch it, you will find it lingers at various points, and while it is longer in the cecum than in the sigmoid flexure, still it lingers all along the prolapsed thin colon. That colon has not sufficient muscular power to force the contents of the bowel along over this mountain.

The other remark I wish to make about Dr. Marvel's operation, which is ingenious, is this; in the old days, when we were doing operations for retroversion, I use to fold the round ligaments upon themselves very much after the method of Dr. Mann of Buffalo, and I had a good many recurrences, and I soon found out the reason was I was folding the round ligaments, covered with peritoneum, and when the stitches are absorbed, I had nothing left but peritoneal adhesions and the muscular coat inside stretching them out. Dr. Marvel has told us that he carefully stitches the white bands, which are strong, together, but after all it is peritoneum that unites and if the patient is allowed to get constipated, if the cecum is allowed to stretch too much, there having been dilatation in the first place, I feel sure there is at least some danger that it will stretch again.

Dr. G. Van Amber Brown, Detroit.—This subject of intestinal stasis is one that recently has been attracting our attention very much—a fact due largely to the *x*-ray observations and the deductions of different observers therefrom. The particular point I wish to refer to in connection with Dr. Pantzner's paper is intestinal stasis associated with appendicitis. I think it is Cheever who has called attention to the fact that the most frequent complication of appendicitis is postoperative intestinal stasis. We may have a paralysis consequent upon infection of the peritoneum. This is usually relieved by proper nonoperative treatment. Another class is due to mechanical twist or kink, most frequently affecting the lower ileum. Often the appendix is embedded along the lateral pelvic wall so that in tearing it loose, we leave a broad denuded area, for some reason or other the lower part of the ileum gets over in the space and becomes attached. Naturally early operative interference is necessary to save the patient.

Just Monday morning, while operating upon a patient for tumor

of the trigone of bladder, in entering transperitoneally, I found this particular condition. In March the woman had been operated upon for appendicitis, the appendix having been removed, but the pathology causing her trouble had not been removed. This was a tumor in the bladder. At the site where the appendix had been dug loose, the ileum about 6 inches above the ileocecal junction had become embedded. The woman had been suffering ever since from marked constipation. There seemed to be no reason except this for her constipation.

Regarding the *x*-ray findings, Jordan lays down this law. You will find where you have a static duodenum there is invariably stasi; farther down the line at the ileum and usually at the sigmoid also, and, *vice versa*, if you find there is no dilation of the duodenums you will find no stasis farther down. This fact should always be kept in mind in studying *x*-ray plates. Incidental to this, he further states that duodenal ulcer is a late stage in the process of bacterial infections owing its origin to intestinal stasis. It should be remembered that the duodenum is the most sensitive part of the intestinal tract and too in giving, a bismuth meal, we should not give the ordinary dose of 2 ounces, but should give as does Mr. Lace 6 ounces.

Dr. Thomas B. Noble, Indianapolis.—For a long time I have been much interested in the matter of alimentary stasis, and I use the word alimentary because no one can properly review this subject without taking into consideration the entire alimentary tube. There is an analogy between the urinary apparatus and the gastrointestinal. The urine is emitted from the ends of the ureters into a reservoir where it remains, as it would seem, where nature intended it to be emptied at a convenient time. It would be very inconvenient and crippling were the urinary organs stopped at the end of the ureters and we had urine dribbling from our bodies every few seconds in three or four drop quantities. So nature has provided us with a reservoir. Likewise we find in the alimentary canal certain chambers for certain purposes shut off and guarded by certain doors or constrictions or sphincters. We find when food remains in the mouth for a time, it is ground, salivated and hurried on by sphincteric muscular activity and forced into the stomach where it remains for a while and certain processes of digestion occur out of which it is forced and shut off again by sphincteric action by the pylorus, and for a longer time it remains in a tortuous, slowly moving sluggish canal, and afterward is deposited in a reservoir where, when we are through with it, we can empty it from the body. If the power entering into this compartment be involved, there will be a leakage backward into the intestine. The same thing occurs with all of the sphincteric structures along the alimentary tube, and we will have regurgitation which means stasis, which means a lack of function, which means disease.

When we come to consider the question of relief from stasis we have to consider the whole line and Dr. Morris has referred to the sigmoid very properly, for no man can think of an operative relief for stasis without looking to the sigmoid. Some of these sigmoids are

long enough for patients to wipe their noses with if they had them out where they could do it. Others are short, and twisted upon themselves and bent. They may be in a tortuous condition brought about by adhesions the result of inflammatory reactions which do not reveal themselves at all in the histories of these cases. I have no doubt that hemorrhages occurring during the processes of ovulation produce blood clots and hematomata about the broad ligament, and are oftentimes in their absorptive processes the cause for the production of tortuosities and obstructions about the sigmoid in the presence of perfect tubal conditions. We know the very prevalent influence produced by the tubes in a pelvic organ. We have very commonly to consider the fact of anal fissure and rectal patho logy in the production of constipation, in the production of retention in this reservoir of these excreta and the resultant dilatation from stasis. So beginning from the margin of the anus upward, considering next the rectum and sigmoid, we come back to the colon and to the head of the colon and arrive at the appendix and consider the pathological sequences about the appendix as the field in which we are going to get sole causations for this condition. This is, I believe, wrong. We must consider the entire field if we are going to get at the true status of affairs and do anything toward a cure of the cases.

I wish to speak again with reference to the ileocecal valve which has been overlooked in connection with a cure of this affection. I believe it is of decided importance to so do the operations as to retain the integrity of this structure, so that the food products, the excreta when once dumped into this reservoir, cannot get back again, as they will get back if you do an anastomosis between the colon and the ileum. There you will leave an open gateway, with a strong vigorous musculature on the one side opposed by a much weaker one on the other, and when the stronger acts it will regurgitate back upon the weaker, and there follows dilatation of the ileum such as you see in those cases of cecal stasis with an incompetent ileocecal valve. The operation then which preserves the integrity of the ileocecal valve will mean an operation which carries you below the ileocecal valve, or such an operation as will necessitate the transplantation of that ileocecal valve. And I do not believe any man lives who can make an ileocecal valve of the efficiency that we find already made for us. An operation then must contemplate the integrity and the preservation of the ileocecal valve above the chamber, the last reservoir, so that we are driving then below the ileocecal valve to the cecum. Some operation is going to be devised here of short circuiting character which will give relief. I am not going to say that the operation of ceco-sigmoidostomy is the operation of choice, but I am going to say that in my experience with it it has given relief, and when the anastomosis is made at the most dependent portion of the cecum and united low down at the lower end of the cecum by a very wide free opening, and a restitution of the ileocecal valve, which in many of these cases is found incompetent, by some means there follows the relief of symptoms, the recurrence of health, and the disappearance of evidences of disorder. I have

operated on several cases by this means, many of them having been operated for other conditions, the vast majority of them having had fibroid tumors removed, they were not producing symptoms, but these patients were suffering from symptoms of stasis. They underwent such operations as the removal of the tubes, appendectomy, gall-bladder operations, nephropexies and the like. The majority of cases I have done this operation upon have been so operated by others without relief, but they are now relieved of their symptoms. All of you have had expressions from your patients of gratitude relative to the relief they have had following certain operations, and I have with interest compared the percentage of such epistles I have received from patients relative to hysterectomies for fibroids, or appendicitis, or gall-stone operations, and the like, and I want to tell you the percentage is greatly in favor of the ceco-sigmoidosctomy.

Dr. Julius H. Jacobson, Toledo.—There were a few points I wished to discuss before Dr. Noble spoke, and one of them, was the inadvisability of making the ileo-sigmoidostomy operation. Anastomoses between the small and large bowel have not been entirely satisfactory, such patients complain of pain and of the original symptoms continuing after the operation. As a general principle, regarding the anastomotic operations on the intestines, I think every one will agree that anastomoses performed between different parts of the colon, for instance, the ascending colon with the transverse, or the transverse to the descending, are usually followed by most excellent results. I mean, of course, in cases where there are strictures either from benign or malignant growths, above that part in which the operation is performed. These operations on the large bowel are very satisfactory and furnish us with a clue to operations which should be performed for cecal stasis.

Where we anastomose a mobile portion of the intestinal tract like the ileum to a fixed portion of the large intestine, namely, the sigmoid, painful peristalsis often continues and such patients are not relieved even though you do the operation as Lane has advised, and make an end to side anastomosis.

Rutherford Morrison of Newcastle has gone so far as to say that he is doubtful if it is ever necessary or advisable to do ileo-sigmoidostomy. He also states that if the operation is performed, a permanent enterostomy opening into the cecal side of the colon should be made to drain the colon above the anastomosis, the colon otherwise remains as a blind pouch giving trouble and continuing the stasis.

The only form of anastomosis between the large and small bowel which has been satisfactory is where the cecum and ascending colon and a portion of the ileum have been removed for malignant disease, and the ileum carried up and anastomosed into the ascending or transverse colon.

I think a great step forward was made when Eastman published his operation of ceco-sigmoidostomy. This operation permits an anastomosis between two portions of the large bowel, for the correction of stasis.

Eastman showed at the last meeting of the American Medical

Association in Atlantic City that his operation did not short circuit the intestinal contents but that the fecal current kept on going around in the natural way in spite of the fact that good results followed the operation. Eastman particularly emphasized the fact that drainage of the cecum and ascending colon is the all-important factor following the operation of ceco-sigmoidostomy and accounts for the good results.

At the Toledo meeting of this association I presented a paper on the chronicity of appendicitis. At that time I tried to emphasize a fact which has existed in our literature ever since the surgery of appendicitis began, namely, that from a pathologic standpoint we rarely see a case of acute appendicitis, that mostly all of our cases are chronic, and what we call acute appendicitis is in reality only an acute exacerbation of a chronic process.

I think all of you will agree that we very seldom see an appendix which does not present evidences of preexisting inflammation.

I do not consider it proven that we have hematogenous infection as a cause of appendicitis. The work of Cannon and others has shown reverse peristalsis in the ascending colon consequently we have normal stasis of intestinal contents in the cecum and wherever there is stasis, the bacterial count is high. Stasis in the cecum causes infection of the appendix, and that is the reason why we have appendicitis so frequently.

The operation which Dr. Marvel has described to-day is interesting and only emphasizes the work of Wilms in connection with cecum mobile.

I wish to speak of another important method of treating visceroptosis. We all know, that such patients get relief when we put them in the Trendelenberg position and apply adhesive plaster after the method of Rosewater and Achilles Rose. By so doing you can give these patients symptomatic relief. The idea we have tried to carry out is to give these patients a permanent abdominal belt or support if for other reasons we are obliged to open the peritoneal cavity. We make a median incision, correcting all pathology which may be present in the pelvis, or whatever else we wish to do. The final steps of the operation being a plastic procedure which extends the incision out into a sort of Y on either side of the umbilicus. The anterior abdominal wall is shortened from side to side below the umbilicus and laterally or obliquely above the umbilicus, so that when we finish, the incision looks like the letter Y. The external oblique fascia is extensively overlapped.

In those cases where this operation has been made, we have found by *x*-ray examination afterward that the colon has been raised. I believe these abdominal plastics, where we increase the intra-abdominal pressure to get the organs into their proper position have a field of usefulness.

Dr. David Hadden, Oakland, California.—I should like to present a suggestion, but without comment, that may be interesting in connection with the work of Dr. Morris. I wish to speak of some experimental work that Dr. Lemuel Adams has been doing on dogs,

but whether he has done it in the human being or not I do not know. After a lateral approximation he makes a circular incision about three-quarters around the bowel, down to the mucous membrane, separating the mucous membrane from the muscle wall above and below. He slides the proximal muscle layer underneath this distal muscle layer (indicating), leaving the mucous membrane untouched. Thus he has a valve, which goes right across the whole lumen of the intestine above the point of anastomosis, that offers good resistance to any tendency to upward flow, but no obstruction to passage in the normal direction.

Personally, I have not run across a case of stasis that I thought required anastomosis. My cases have been secondary either to appendix operations, two of them especially marked where the cecum was adherent to the abdominal wall for several inches, or were due to adventitious bands. Sometime I want to show *x*-ray pictures of one case of stasis following a Gilliam operation in which the round ligaments had pulled away from the broad ligaments, and not only the cecum but the sigmoid wandered around the cords, causing practically complete obstruction at times. Cutting the round ligaments has cleared up all of that trouble. The *x*-ray showed tremendous distention and elongation of the bowel that has already in the few months since operation practically disappeared.

Dr. David Hadden, Oakland, California.—There are two questions I want to ask Dr. Bainbridge. First, whether he considers the general peritoneal colon infection as a secondary condition to the stasis or as the cause of the stasis? Second, personally in my small number of cases I have been impressed with the rather large proportion of positive complement fixation tests obtained, and I should like to know in what proportion of his cases there has been specific infection, and whether he considers syphilis as a frequent cause of adventitious bands in the abdomen?

Dr. J. Henry Carstens, Detroit.—It is not the colon alone that is the cause of the trouble in these cases. It is also the stomach, the liver, and more or less all the ligaments in the abdomen. After Dr. Jacobson has done the operation he has described, he puts on a belt and helps these patients along in that way. But that is not enough. One of my gastroenterological friends in Detroit has invented a belt to hold the organs up. It seems to me, all things considered, this condition is largely constitutional. It is brought about by the faulty carriage of girls which we see to-day. There is muscular weakness, and the trouble is not only physical, but mental. A great deal of this trouble is developed, is cultivated. Most of these patients are women. Why do not men have the same kind of trouble? If you take these women and train them from youth up as they should be they will not have some of these conditions. A girl comes along who is say twelve years of age. That girl is going to have the kind of trouble we have been describing. You can tell it from the manner in which she walks. We see another girl, and we can say positively that she is not going to have such trouble. If you take hold of a girl, twelve years of age, you can manage and control her, and if you can

do this, she is not likely to have this kind of abdominal trouble, this kind of relaxation. I have four girls in my family and we have not got that kind of trouble. I gave them a different kind of training. I believe in making tomboys out of girls. I make them exercise and work, and if you will do that with these patients and get hold of them early, you can by instituting proper physical exercise develop these abdominal muscles. By increasing the strength of these muscles by exercise, you likewise increase the strength of all the muscles in the body, as well as the ligaments and everything else, and you will bring about a condition that will cure these patients before they need any operative interference. I hope we will try to prevent this condition without requiring such operations as have been described.

Dr. Pantzer (closing the discussion on his part).—Medical literature on this subject is becoming so voluminous that all have reason to condense their say. Perhaps, in an effort to condense, I have covered too much ground in my brief paper.

It depends upon the anatomical interrelation a loosely hung bowel has with the adjoining organs, whether in a given case this condition gives rise to trouble. I have found in a number of cases at operation that the transverse colon ascended directly from the cecum to the splenic flexure in individuals who had not suffered from stasis. Though nothing was done to correct this condition, the patients suffered no stasis while under observation afterward for years. It is not required to "hook up" the bowel at the hepatic juncture in such cases. The cecum is naturally a relatively mobile organ. It is in a measure like the adjoining part of the ileum. In the instance where the cecum is found grossly below a line drawn from the upper superior spine of the ileum to the umbilicus, or much higher than this line, or grossly contracted, distorted, thickened or impacted with feces, it is safe to assume the prevalence of stasis.

The extent to which pericolic membranes require division to reproduce the normal relations and condition is a surprise to him who has not attempted it. As a matter of fact this treatment of pericolic membranes is done by very few operators and then commonly done scimpingly and noneffectively. Where thoroughly done, a cecum which before operation was deformed and displaced, and which immediately after the division of the membranes reaches down to Poupart's ligament and fills the right half of the lower abdomen, within a few weeks may be found to be of normal size and position.

As to the effect obtained from short-circuiting of the bowel, I can see that its immediate effect may be most satisfactory. The stoppage of further toxemia with free catharsis has an effect I would liken to taking an individual who has been in a room full of smoke out into the open air. But the risk to life by the operation of short-circuiting, and the ultimate effect of permanently excluding the colon from the economy, seem to me ground sufficient for rejecting it, all the more because the resurrection of this function by the simple surgery, I employ, supported by remedies producing purgation through all eliminating organs, gives satisfactory results.

The relation of the kidney has been referred to in my paper.

The retraction and shortening of the posterior cecal and colic wall occurs both in the direction from the cecum upward and from the hepatic flexure downward. Thus in these cases the kidney is found drawn downward, and by the anatomical relation the kidney holds to the duodenum, this organ suffers kinking. Both conditions, the floating or low kidney, and the duodenal angulation are relieved by the operation of free division of all pericecal and pericolic membranes. I hope that the operators doing the short-circuiting operation will early give us full reports on the ultimate effects it has upon the human economy.

Dr. Robert T. Morris, New York City.—Dr. Marvel's idea will simplify operation very much indeed. It has been a little difficult to hold this bulging ballooned colon, and if I run a longer suture through, that is, two longitudinal sutures through the colon, it will be easier to put in the accordion stitch.

Dr. Bonifield asks if this is not going to stretch out subsequently. That is why I paint with iodin, and why I use the Pagenstecher linen thread. I believe those two resources will help particularly when we do not have semisolid contents going through the colon and causing it to become distended.

Dr. Noble and Dr. Carstens spoke truly when they referred to these cases as representing only one part of the whole trouble. We are speaking by synecdoche, and we have tried to do too much and have tried to concentrate our attention upon one organ after another and to relieve the patient of all her ills by doing this operation upon the colon, that one upon the kidney, and another one upon the ileum, when as a matter of fact, nearly all of these patients who are in trouble are in their peculiar condition because they should have had their ancestry short-circuited by one or two generations. (Laughter and applause.)

The trouble is a constitutional condition. The fashionable gait at the present time, the hyena slink is due to the fact that fashionable girls who are not obliged to work sometimes have a prolapse of their works. Neurasthenic rich girls are looked up to by the shop girls, consequently, the rich girl who is not obliged to work, and who has a prolapse of her works on that account, and develops the hyena slink because she cannot help it, is taken up as a model by the shop girls who think it is a fashionable pose. They acquire the pose largely by mimicry. These cases of fashion belong originally to the neurasthenic group of people.

Dr. Marvel (closing).—My paper deals with but one part of intestinal stasis, and that is with reference to cecal stasis. Not for one moment did it ever enter my mind that the responsibility for all intestinal stasis rest in the cecocolon. However, were a finger and toe both involved and you removed the toe, relief would probably be given the toe, but it could not be expected that relief from both the toe and finger would result, certainly the toe would require treatment. So it is with the cecum; you will not relieve other form of stasis by its correction, but the correction of its evil is directly indicated. I am convinced that the responsibility of intestinal stasis rests more in the

cecocolon pouch than any other part of the intestinal tract, and that this operation is desirable to give relief in view of the fact that it conserves all tissue, at the same time being a simple procedure.

I agree with Dr. Carstens and what Dr. Morris, has emphasized, that if the ancestors of the present generation had been educated by proper habits there would be fewer sufferers. I doubt that such instructions to the present generation will do much for those women who are past adult life, and have with them now these conditions. They need some help to give them more comfortable lives.

I expected to be harshly criticised, and I know I am in your minds, that I have not presented any *x*-ray evidence to show stasis before and none after operation. This is not always possible or expedient. The operator enters the abdomen ofttimes for some other indicated surgery and finds a ballooned colon as well. It matters little to the patient whether skiographed or not if this abnormality be present. The procedure is accomplished without the sacrifice of tissue or jeopardy of life and it conserves every function. I commend it to you and hope you will try it and report your experience as to the results.

SOME THOUGHTS AND VIEWS ON THE MORE COMMON GYNECOLOGIC CONDITIONS NECESSITATING OPERATION.

BY

WM. H. HUMISTON, M. D.,

Associate Professor of Gynecology in the Medical Department of Western Reserve University,

Cleveland, Ohio.

THERE is no necessity for presenting a paper on this topic before this society, as far as any immediate usefulness or benefit it may be to its members. But each of you can see the results it will have upon the general practitioner who does his own minor gynecologic surgery, by such methods that in a vast number of instances he converts a minor case into a major one, through his lack of knowledge, experience and technic. The proceedings of this Association are read throughout the United States by practitioners of medicine, and a consensus of opinion promulgated here to-day will in my judgment be of great weight and value to a large number who are not qualified, but do assume to do this work and through lack of training and experience obtain results that are infinitely more serious than the original complaint. Finally the patient comes into the care of an experienced man who finds a condition that requires a major operation to give relief, and restore health, through the sacrifice of the organs of reproduction.

Each member of this Association must be impressed with the increasing number of cases coming to him suffering from pelvic abscesses, with a history of having had a curetment a few weeks earlier following a miscarriage or childbirth at term. Or less frequently following a sewing together of the torn muscles of the pelvic floor and perineum in which, through faulty technic, an infection has arisen. Still another frequent condition, and that is, a curetment to relieve an endometritis with profuse leukorrhea in which there is tubal suppuration that is not recognized, and the trauma has relighted the slumbering process in the adnexa with all the complications that may follow to endanger the life of the patient.

No one should undertake or advise a curetment of the uterus that has not a trained touch, and is capable of determining the condition of the uterus, tubes and ovaries.

A uterus fixed, or with *impaired mobility*, requires more than curetment. The red lantern of danger should be hung out. A misplaced, or fixed uterus in place, will not be improved by curetment; on the other hand, serious complications usually follow careless and partial work.

I shall briefly speak of the technic of treating abortion. If but *one* of the *two* usual symptoms are present, *i.e.*, pain or hemorrhage, conservative treatment can be used and often the threatened miscarriage can be averted. But if the patient is suffering pain with hemorrhage, it is not best, in my opinion, to attempt conservative treatment, but at once take steps to save the great loss of blood that usually occurs. Put patient in bed, shave vulva and pubis and prepare vagina and external parts as if you were to do a curetment, trachelorraphy or perineorrhaphy. I pack the cervix firmly with 1 per cent. iodoform gauze using a long strip made up of numerous shorter ones tied together. After packing firmly the cervical canal the vagina is filled with the balance of the strip. A T-bandage to hold a sterile gauze pack over the vulva is used. The packing of the cervix increases the uterine contractions and the packed cervix and vagina prevents loss of blood. In twenty-four hours usually (occasionally forty-eight hours), the gauze is removed and the fetus and membranes are found expelled in the upper vagina. If not, the cervix is dilated to a degree that with the gloved finger or suitable forceps the uterus can be thoroughly emptied. A thorough flushing of the uterine cavity with sterile saline solution hot, will remove all blood clots and small decidua. A generous aseptic gauze pack is kept over the vulva communicating with a small strip just within the introitus, thus insuring steady drainage for a few days.

Perineorrhaphy.—I feel that there are more failures in this operation than successes. You see so few good muscular results; too many skin and mucous membrane affairs affording no relief to the woman. The old idea still prevails that the denudation of mucous membrane, butterfly in shape, down to the fascia, rolling it together with sutures, will give relief. But it does not, as the torn retracted muscles are left undisturbed. The method I use does not require the removal of tissue. An incision in the median line of the posterior vaginal wall down to the fascia and exposing the fibers of the sphincter ani muscle which is to be attached to the torn perineal muscles, is all the cutting required. With spear-pointed scissors double cutting edge, the fascia is punctured on one side and the scissors spread and pulled out. This will expose your muscles and the muscles thus seen can be picked up and united by interrupted catgut sutures.

An important suture is the one that unites the levator ani to the sphincter ani muscle. A running suture to unite the fascia over the muscles and another bringing together the mucous membrane completes the operation. All suture material is animal, thus making the after-care simple. Catheter is used for forty-eight hours —three times in twenty-four hours.

The immediate repair of the pelvic floor and perineal lacerations following labor should be a routine performance, and the gynecologist should be called in to do it in the large majority of cases, for as yet we have *too* few properly trained in obstetrics that pursue the general practice of medicine. When the cases of miscarriage and labor at term are carefully and efficiently taken care of, the work of the gynecologist will be so reduced he will be forced to widen his field of work, or starve.

OPERATIVE FINDINGS IN TWELVE CASES OF CHRONIC INTESTINAL STASIS.

BY

WILLIAM SEAMAN BAINBRIDGE, Sc. D., M. D., C. M.,

Professor of Surgery, New York Polyclinic Medical School and Hospital; Attending Surgeon, New York Skin and Cancer Hospital, Etc.,

New York City.

(With fifteen illustrations.)

It may be said that the indifference with which Sir Arbuthnot Lane's earlier pronouncements concerning chronic intestinal stasis were received has been largely overcome. Skepticism may have been the impelling force in overcoming this inertia, but it is safe to say that attention, thus directed to the subject, has been maintained by genuine interest. However gained, it has continued, in increasing measure, and stasis may to-day be rightly denominated one of the great questions before the medical world. For some years, medical societies and medical journals have been more or less concerned with dissertations on Lane's theories and his clinical findings. The *pros* and *cons* of the matter are being thoroughly threshed out in the mills of experience and controversy. Internists, gastroenterologists, radiologists, pathologists, and surgeons, are taking part in the discussion of this important and seemingly far-reaching question of chronic intestinal stasis and its treatment.

The one important part of the output of grist from the mill of controversy and discussion is the establishment of the facts of the *existence of the adventitious intraabdominal structures*, to some of which Lane has been calling attention since 1887, and to which he has applied the term, "evolutionary bands," and of the condition which he has described as "chronic intestinal stasis."

Around these two facts have developed some very creditable work by different investigators, and quite an interesting and valuable literature. There are still controversial questions involved, but there is good reason to believe that we are on the right road and are making progress toward their solution.

Some observers are studying the subject with special reference to one particular phase, others another phase; the correlation of

the knowledge thus obtained must be fruitful of good results in the matter of reaching definite conclusions which, in time, may be pronounced the consensus of opinion. Some are interested in the etiology or pathogenesis of the various adventitious structures. Others, from the point of view of the radiologist, are adding their data with reference to the diagnosis of the conditions resulting from these "veils," "bands," "folds," and "membranes." Internists and gastroenterologists, as a rule, direct their attention largely to the treatment of these conditions by nonsurgical means. The surgeons reserve the right, as occasion seems to demand, to resort to operative procedures, such as cutting and suturing bands, short-circuiting, colectomy, or other surgical measures. Some have not joined the ranks of the optimists, but still register among the pessimists. They are busy discovering flaws in Lane's line of reasoning; in detecting the impossible in his pathology; in condemning him to the category of the hopeless hobbyist. They see in his propensity for exploring new fields, the danger of riding his horse to death, as a distinguished pathologist has expressed it. They have conjured up night-mares in the form of "small minds and untrained"—"immature surgeons of two continents," who, following these "phantasms of a disordered imagination," are apt to "inaugurate an era of short-circuiting, performing this or the yet graver colectomy for all sorts and conditions of disease in all sorts and conditions of men, women, and children, on the smallest possible pretext."

Lane himself, referring to the attitude of some of his conferes, says: "When I first began to draw the attention of the profession to the great part played in the life history of the individual by a delay in the passage of material along the alimentary tract, and drew a parallel between the human digestive canal and a drainage system, my observations were treated as being the fantasies of a vivid imagination. Later, when the accuracy of these observations was being tested in the field of hard fact, the more progressive observers began to realize that my premises were not so fanciful as had at first been supposed. Now, the subject of chronic intestinal stasis, and its disastrous sequelæ, is occupying the attention of the profession more and more completely every year."

I am glad to be able to count myself among the small number of those who, from the first, have received his views with open mind, and have been content to follow Lane's footsteps as an investigator, not accepting unqualifiedly all his theories, but being open to conviction. Thus, for eight years and more I have been following,

at first hand, his work and his cases. I have had the privilege of examining many of his patients before operation, of watching Lane verify his diagnoses at the operating table, and of examining these same patients, on successive annual visits to London, after operation. I have studied the subject of chronic intestinal stasis from many points of view, not forgetting the far larger group of patients who should never be compelled to have recourse to surgical intervention. I have endeavored to maintain the spirit of open-mindedness, believing that there is here a great field for investigation and a reasonable hope of doing lasting good to many by means of both nonsurgical and surgical treatment.

It is important, it seems to me, to study the human digestive canal as a great drainage system, the human body, if you please, as a house, and the digestive system as the drainage plant of the house. It is important, too, to consider this sytem as a *whole*, remembering that defects in one or more parts are apt to derange the whole plant. It is well to study the matter by beginning in the cellar, so to speak—the rectum—as would a plumber in looking for defects in the plumbing system of a house, and to work up to the attic—the stomach—then to reverse the order and to work from above downward.

By following this method of study I have been able to find the adventitious structures in the abdomen, to which Lane has so persistently called attention, and which he has so clearly described. I have also been able to demonstrate to my own satisfaction, and to the conviction of assistants and many who have witnessed the operations, the kinks in the intestine which these bands cause, and the resulting dilatation of the involved portions of the drainage canal. The diagnosis thus established at operation, has been confirmed, in a large proportion of cases, by the improved condition of the patient after surgical treatment.

So many observers have verified the existence of the bands, which have come, without his will, to be known as "Lane's bands," and the resulting kinks, which many are accustomed to designate as "Lane's kinks," that these particular matters are gradually emerging from the category of controvesy, and are now very generally accepted as facts.

The etiology of the various "bands," "folds," "veils," and "membranes," is still a subject for discussion, and has given rise to an unfortunate terminology which has tended in a measure to obscure the more important issue of their existence and effects.

The condition of stasis which results, however, from the kinking

of the gut by these bands, is, as I have said, fairly well established, while the immediate and remote results of this stasis is still a subject for discussion.

It is not my purpose, on this occasion, to discuss any of the theories which still furnish a camping ground for opposing advocates. Nor is it my intention at this time to dwell upon the classification of cases, or upon the treatment of cases of the different classes.

I wish merely to present a series of cases, selected from hospital and private practice, as illustrations of several points, accepting, for the sake of argument, we will say, that Lane's major premises are correct. These points I shall consider categorically and briefly:

(1) The possibility of making the diagnosis of chronic intestinal stasis by clinical examination alone, without the aid of *x*-ray or fluoroscopic study.

(2) The verification of the diagnosis, by the discovery at operation of the bands and the kinks.

(3) The discovery, in certain instances, of conditions which may be interpreted as corroborative evidence of the correctness of Lane's theory regarding the possible remote effects of chronic intestinal stasis.

DIAGNOSIS.

At the recent meeting of the American Röntgen-Ray Society, at Cleveland, I presented a series of twelve cases, giving a comparison of the radiographic with the operative findings. I emphasized the great importance of the *x*-ray and the fluoroscope, when properly employed and the plates intelligently interpreted, as aids to diagnosis, both as regards the existence of chronic intestinal stasis and the causative bands and kinks, and with reference to the possibility of the remote effects or end results of this condition. The splendid work of Alfred C. Jordan, of London, and others, in this particular phase of radiographic work, is certainly monumental, and should by no means be depreciated. I wish, however, to emphasize the possibility, as shown in the cases which I shall present, of making a positive diagnosis of chronic intestinal stasis by the symptoms and clinical examination, without the aid of the other diagnostic measures. If clinical examination leaves the surgeon in doubt, naturally other diagnostic measures should be employed. When skilfully employed, the *x*-ray is of great assistance in the localization of the various bands and kinks. If the surgeon is not fortunate enough to be able to avail himself of the services of an expert radiographer he must, perforce, rely upon his own diagnostic

skill. It then becomes more imperative that he understand thoroughly the mechanics of the great drainage system of the body, and that he familiarize himself with the symptomatology of chronic intestinal stasis.

The symptoms of chronic intestinal stasis are those which result from mechanical changes in the drainage tube. We must take for granted, for purposes of discussion, that Lane's theory with reference to these changes is correct. What, then, are the clinical symptoms in a typical case of chronic intestinal stasis? They may be enumerated roughly in the following order:

(1) Pain or discomfort, usually referred to the region of the duodenum and stomach, but also to portions of the large intestine.

(2) Gastric discomfort, nausea and occasional vomiting, resulting from obstruction to the outlet of the stomach in consequence of ulcer or cicatrization of the pylorus or duodenum, or constricting bands about the duodenum in the neighborhood of the pylorus. These symptoms may be classed under the ordinary category of "indigestion."

(3) Various symptoms which may be catalogued under the term "autointoxication," which Lane has described as "flooding the liver with a quantity of toxic material picked up from the stomach, duodenum, and small intestine, in excess of what the liver, kidneys, and skin are able to deal with." These vary according to the susceptibility of the individual.

Under this head may be grouped a most important set of individual symptoms and physical signs, such as the blotchy appearance of the skin, which is cold and clammy, especially over the extremities; the cold perspiration, of an offensive odor; the loss of fat; the lumpy condition of the breast; thyroidismus, in some cases; tenderness over the ileum; mental torpor—in fact, the entire symtomatology usually described under autointoxication. Headache, melancholia, inability to sleep, or sleep disturbed by unpleasant dreams, also come under this general classification of symptoms.

(4) Constipation, or, as is sometimes the case, persistent diarrhea. In Case IX, of the series herewith presented, diarrhea was persistent and distressing, and could not be controlled by any of the usual means.

Patients who present a sufficient number of the signs and symptoms briefly catalogued above to warrant a tentative diagnosis of chronic intestinal stasis should be safe-guarded in every way. A Wassermann test should be given whenever there is a probability of syphilis. When the clinical examination points definitely to stasis

the abdomen should be opened. Opening the abdomen, however, either with or without *x*-ray examination, is more or less in the nature of an exploratory operation, and is always the last step in the diagnosis of this condition.

VERIFICATION OF CLINICAL DIAGNOSIS BY OPERATION.

The cases which are presented herewith illustrate the possibility of making a purely clinical diagnosis. In each case, as I have stated, the diagnosis was clearly made without the aid of the radiologist. In some instances *x*-ray examinations were made for the purpose of substantiating the clinical diagnosis. In each instance, however, there was evidence, as shown by the symptoms and clinical examination, of marked chronic intestinal stasis.

In briefly detailing the cases I have purposely omitted reiterating the fact that the diagnosis was made of *chronic intestinal stasis*. Inasmuch as my purpose is merely to add to the corroborative evidence by the presentation of a selected series of cases, I shall refrain from giving the general history of the patient, and the treatment employed.

It may not be amiss, however, to say a word concerning the method employed in the making of the pictures of the conditions found upon opening the abdomen. In the first place, I try to have a stenographer present in the operating room, to whom are dictated the findings. The medical illustrator makes a rough sketch of the conditions found just as they appear to him or her at the operation. It requires only a few minutes for the surgeon to demonstrate these to the artist who is skilled in this kind of work. The findings are then checked up by the assistants, and sometimes by visiting surgeons. From this operating-room sketch the artist builds up the drawings, with the assistance of the stenographer's notes, the checkings of the assistants, and the findings of the surgeon. Each picture is, therefore, an accurate interpretation of conditions as actually found upon the operating table.

It is obviously difficult, however, to put into each picture every phase of the pathological condition. Therefore, for the purpose of clarity, without the sacrifice of accuracy, each picture emphasizes some special point or points.

CASES.

CASE I.—F. M. G., female, single, aged fifty-three. Referred by Dr. Grace Peckham Murray, New York City. Operation, Alston's Private Hospital, January 28, 1914.

Operative Findings.—Slight constriction of pylorus; evidence of ulcer on posteroinferior aspect of pylorus, near sphincter. Duodenum greatly dilated; distinct duodenojejunal kink. Bands

FIG. 1.—*A*. Strong band, causing kinking of the bowel above the pelvic brim. *B*. Rectum.

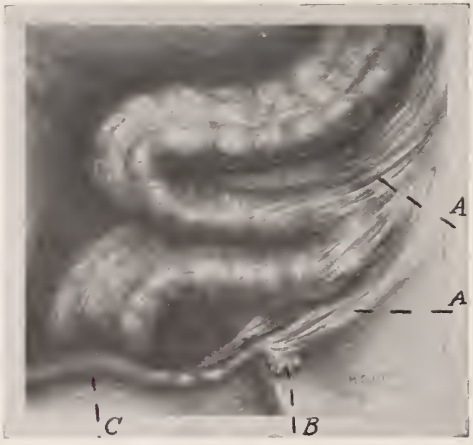

FIG. 2.—*A*. Bands causing kinking of pelvic colon, catching up and enveloping left ovary. *B*. Ovary. *C*. Fundus uteri.

across pylorus, attached to great omentum and transverse colon below and to transverse fissure of liver above. Mobile cecum, hanging down in pelvis. Fixed band at base of appendix, running under

ileum to pelvis. Considerable dropping of transverse colon, hepatic flexure being almost at level of umbilicus, splenic flexure being easily visible, but fairly well supported. Sigmoid very redundant. Distinct external thickening of sigmoid mesentery, with bands an-

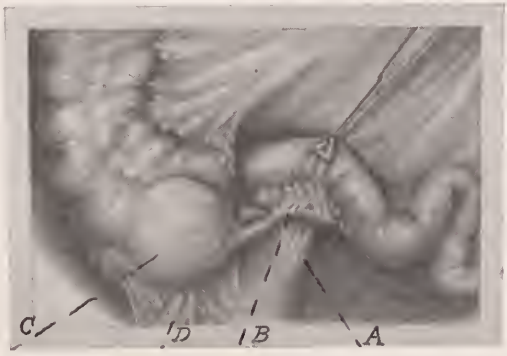

FIG. 3.—*A*. Ileopelvic band. *B*. Appendix adherent to under surface of mesentery and ileum. *C*. Distended and rotated caput coli. *D*. Bands.

choring it tightly in an exaggerated "last kink," as shown in Fig. 1.

CASE II.—S. G., female, aged twelve. Referred by Dr. Eliza M. Mosher, Brooklyn. Operation, Alston's Private Hospital, June, 26, 1914.

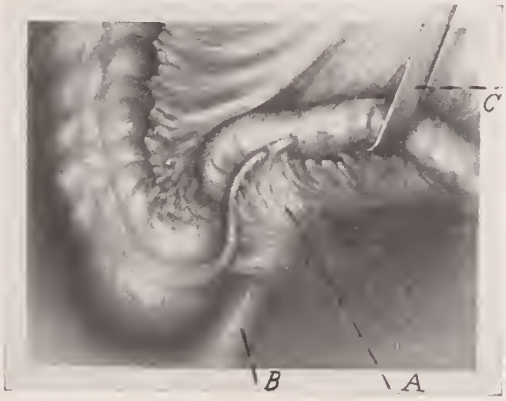

FIG. 4.—*A*. Broad ileopelvic (Lane's) band. *B*. Pelvic brim. *C*. Ileum held up out of cul-de-sac.

History of epilepsy.

Operative Findings.—Cecum prolapsed and rotated inward and downward around a pivotal axis represented by bands extending from the meso-appendix to the under surface of the ileum. Appendix somewhat congested and adherent to last few inches of under

surface of ileum. Distinct angulation 1 1/2 inches from ileocecal valve. Valve not patulous. A band extended from base of gall-bladder across dilated duodenum to greater curvature of stomach, and to right lateral portion of gastrocolic omentum, where it was about a half inch wide. Sigmoid colon very much elongated, with distinct crystallization of the lines of stress over brim of pelvis. Left ovary and tube adherent to these bands (Figs. 2 and 3).

Case III.—C. R., female, married, aged forty-one. Referred by Dr. Isabelle Thompson Smart, New York City. Operation, Alston's Private Hospital, May 30, 1914. Early stasis.

Operative Findings.—Beginning Lane's or ileopelvic band; adhesions of appendix underneath terminal ileum, as shown in Fig. 4. Right ovary cystic and fibrous.

Case IV.—R., male, aged thirty-five. Referred by Dr. C. F. Sayles, Miami, Fla. Operation, Alston's Private Hospital, May 28, 1914.

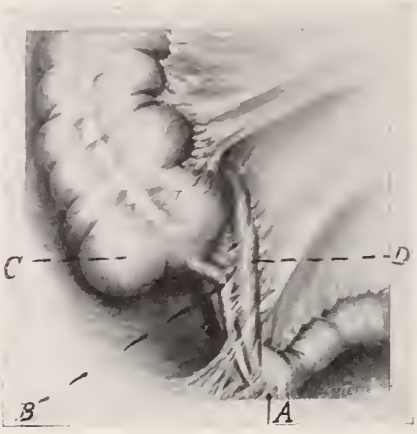

Fig. 5.—*A*. Ileopelvic band. *B*. Attachment of appendix to under surface of mesentery and to ileum. *C*. Cecum. *D*. Ileum greatly narrowed in caliber when large bowel is pulled up toward diaphragm, because of fixed point at *A*.

Operative Findings.—Ileum tightly adherent to pelvic floor about four inches from ileocecal valve. Appendix caught in same band and adherent down along ileum. Adhesions from gall-bladder across duodenum and at sigmoid colon. (Fig. 5.)

Case V.—C. M., female, married, aged thirty-four. Operation, New York Skin and Cancer Hospital, June 2, 1913.

Operative Findings.—Great omentum firmly adherent to right ovary, tube and broad ligament, and to apex of bladder, and fundus uteri, by bands, some avascular and some vascular. Laterally, omentum adherent to anterior longitudinal band of ascending colon as far down as ileocecal valve. Adhesions, binding omentum to ascending colon, transverse colon and lateral abdominal wall. Transverse and ascending colons almost amalgamated, making an acute angle

at hepatic flexure. Appendix turned under and attached to under surface of mesentery, excepting at its tip. No ileopelvic bands.

Stomach dilated, pulled down and somewhat fish-hooked when

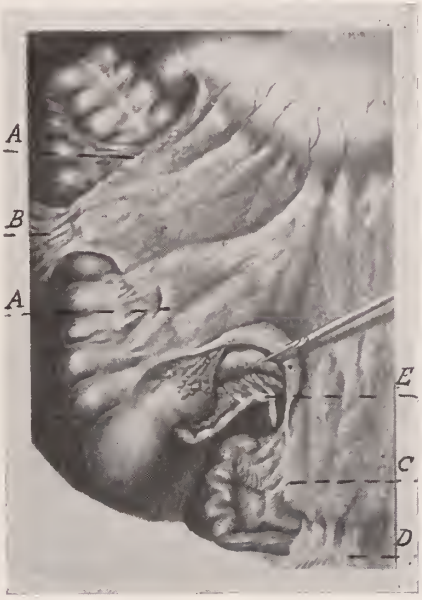

FIG. 6.—*A*. Omentum attached to ascending colon. *B*. Attachment of omentum to abdominal wall, across ascending colon, causing considerable constriction. *C*. Attachment of omentum to ovary and tube. *D*. Attachment of omentum to bladder and fundus uteri. *E*. Appendix angulated and adherent to under surface of mesentery.

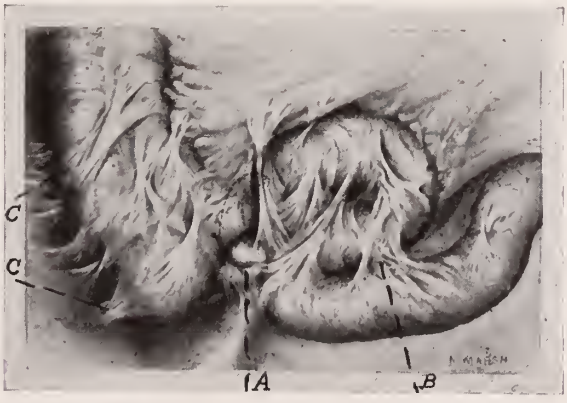

FIG. 7.—*A*. Appendix, forming a cavity, in which was situated an abscess. *B*. Inflammatory adhesions. *C*. Bands of fixation of cecum.

traction was made on omentum. Gall-bladder normal. No duodenojejunal kink. (Fig. 6)

Case VI.—A. P., female, single, aged twenty-seven. Referred by Dr. Nan Gilbert Seymour, New York City. Operation, Salvation Army Rescue Home, March 14, 1914.

Fig. 8.—*A*. Mobile cecum, with band from great omentum over head of colon. *B*. Same band constricting terminal ileum. *C*. Thickened band from omentum over to ascending mesocolon. *D*. Greater curvature of stomach, which, when patient was in upright position, caused a pull on the head of colon.

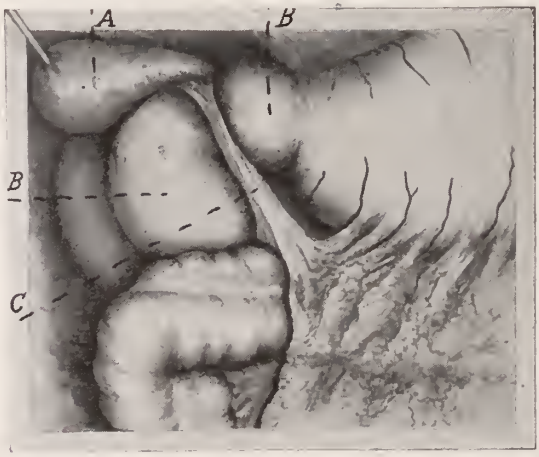

Fig. 9.—*A*. Distended gall-baldder. *B*. Dilated duodenum. *C*. Constricting band.

Operative Findings.—Appendix curved up behind cecum and terminal ileum; greatly enlarged in caliber. An opening had formed between appendix and terminal ileum, this end of appen-

dix being smaller than elsewhere. The appendix constituted an abscess with two openings, one draining into the cecum, the other into the terminal ileum. This hanging up of the appendix was the cause of marked chronic intestinal stasis. The adhesions shown in Fig. 7 had been separated partially before the base of the appendix and terminal ileum were visible.

FIG. 10.—*A*. Attachment of great omentum to cecum. *B*. Attachment of great omentum to pelvic wall.

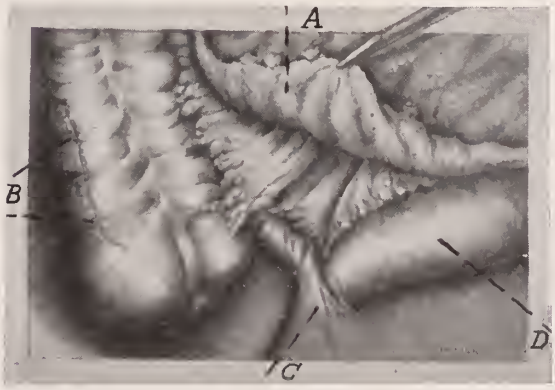

FIG. 11.—*A*. Great omentum lifted up, adhesions cut and tied off. *B*. Raw surfaces on ascending colon covered over by suture. *C*. Ileopelvic (Lane's) band. *D*. Greatly distended ileum.

CASE VII.—F. C., female, single, aged eighteen. Referred by Dr. Isaac Arthur Stoloff, New York City. Operation, New York Polyclinic Hospital, April 18, 1913.

Operative Findings.—Stomach somewhat congested, pylorus patulous. Duodenum slightly congested and dilated. Liver normal. Right kidney, which had been stitched too snugly in place in a previous operation, rubbed against last two ribs at junction of the cartilage with the bone.

A strong band of adhesions extended from greater curvature of stomach to the point from which the appendix had been removed at a previous operation, crossing the ascending colon and making an indentation in colon. Another band extended from great omentum further to left, and passed to ascending colon, being fastened to its mesial aspect.

Caput coil and cecum entirely mobile almost to hepatic flexure, not normally supported, and with a rather thickened mesentery. The adhesions formed a fixed point around which the intestine was enlarged. Marked duodenojejunal kink. Redundant sigmoid. (Fig. 8.)

FIG. 12.—*A*. Prolapsed transverse colon. *B*. Pericolic membrane ("Jackson's membrane"). *C*. Patent ileocecal valve.

At a second operation, April 23, 1914, a strong band of adhesions was found passing from the base of the gall-bladder across the dilated duodenum and transverse colon (Fig. 9).

CASE VIII.—G. G., female, single. Referred by Dr. Hermann Eichhorn, New York City. Operation, New York Polyclinic Hospital, December 19, 1913.

Operative Findings.—Great omentum adherent to lateral margin of ascending colon and to right broad ligament. Omentum dissected away, revealed a band attaching terminal ileum to right broad ligament and to brim of pelvis, causing angulation in the gut, which was greatly distended proximally and collapsed distally to the point of angulation. (Figs. 10 and 11.)

Case IX.—J. B. S., female, married, aged forty-four. Referred by Dr. E. H. James, Westfield, Mass. Operation, Alston's Private Hospital, March 29, 1913.

Operative Findings.—Mobile cecum, with distinct bands from

Fig. 13.—*A*. Thickened edge of omentum, adherent to abdominal wall, ertracted to show scar on liver (*C*), where irritation by this band caused changes. *B*. Retractor holding back omentum to show scar on liver. *C*. Scar on liver.

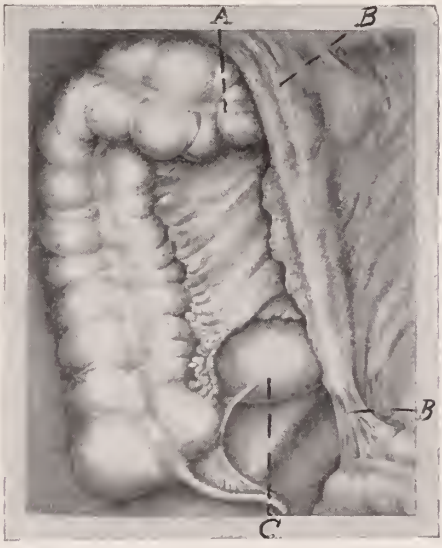

Fig. 14.—*A*. Malignant stricture of transverse colon. *B*. Band of thickened omentum from greater curvature to sigmoid. *C*. Dilated ileum.

cecum to abdominal wall—pericolic membrane—("Jackson's membrane"). Marked prolapse of transverse colon, causing an acute angle of obstruction at the point where the upper margin of "Jack-

son's membrane" was situated, as shown in Fig. 12. Appendix distended and containing two enteroliths. Ileum showed no ileopelvic bands, but was distended to the size of the ascending colon. Ileocecal valve patulous. When tension on "Jackson's membrane" was relieved by lifting up the transverse colon, this part of the canal became very much distended. Some adhesions at splenic flexure of colon, causing angulation between descending and transverse colon. Stomach, gall-bladder, and liver normal.

CASE X.—L. S., female, married, aged forty-nine. Operation, New York Skin and Cancer Hospital, April 30, 1914.

Operative Findings.—Great omentum broadly attached to upper surface of liver just to right of gall-bladder, and extending backward over an area of two inches by three-quarters of an inch in extent; attached for a considerable distance to the parietal peritoneum on the right side, in the vicinity of the attachment to the liver.

FIG. 15.—*A*. Thickened gall-bladder. *B*. Gall-stones. *C*. Beginning cancer of liver. *D*. Fundus of gall-bladder before opened.

When these attachments were severed, an extensive scar on the upper surface of the liver was exposed. Firm bands in cecal region, extended from cecum, three-quarters of an inch from base of appendix to parietal peritoneum of pelvic brim. Another band, like a broad thickening of mesentery of the ileum, extended from a point about an inch from the ileocecal valve to the pelvic brim. Appendix lay between these two bands, pointing to the left and slightly downward. (Fig 13.)

CASE XI.—J. T., female, married, aged sixty. Operation, Ossining Hospital, Ossining, N. Y., December, 1913.

Operative Findings.—Malignant stricture of transverse colon. Band of thickened omentum from greater curvature of stomach to sigmoid, directly over site of cancer. Ileum dilated; ileocecal valve patent. (Fig. 14.)

Case XII.—R. C., female, married, aged forty-two. Referred by Dr. Alice Bugbee, New York City. Operation, Bethesda Hospital, White Plains, N. Y., June 8, 1913.

Operative Findings.—Distinct ileopelvic bands; ileum dilated. Gall-stones; beginning cancer of liver in neighborhood of where gall-stones pressed upon liver. (Fig. 15.)

REMOTE EFFECTS OF CHRONIC INTESTINAL STASIS.

In addition to the usual symptoms as observed in a fairly typical case, Lane has called attention to a series of symptoms and diseases which he believes to be the outcome of chronic intestinal stasis, and which have been called the end-results. He has enumerated a rather comprehensive list of diseases which he believes to be traceable to chronic intestinal stasis, or to the lowered resistance which results therefrom, among which may be mentioned, rheumatoid arthritis, tuberculosis, goiter, and cancer. It is to the last-named disease that I wish to direct especial attention in this connection.

I am not prepared to say, at the present time, how far, in my opinion, chronic intestinal stasis affects the development of cancer. The whole problem of cancer is so involved that we can merely hypothecate concerning its etiology. The interrelationship, however, of ulcers of the gastrointestinal tract and cancer of this region of chronic irritation, as shown in Case XII, and cancer, and of these conditions with chronic intestinal stasis, furnishes food for thought. The last three cases of the series presented seem to me to be significant in the light of some of the possible end-results of stasis.

In this connection I may conclude with a recent statement by Lane: "If the views I hold on the subject are even approximately correct, no bigger question has ever held the attention of the medical profession. It has to do with the ground-work of disease and deals with primary causes, a matter of the greatest moment to us in the explanation of the factors that produce changes in our several tissues, which changes we call diseases, and in the knowledge of the manner in which we can either obviate their development, or alleviate or remove them if they have already developed."

DISCUSSION

Dr. George W. Crile, Cleveland, Ohio.—Mr. President: I have been extremely interested in what Dr. Bainbridge had to say, and I am only sorry he did not have more time. I wish he might have had time in which to tell us how he manages his cases. I have watched Lane's work and have specially studied intestinal stasis for a long time. I have felt my way and have done only four operations in indicated cases. In these four cases, as far as they have

gone, the results have been satisfactory. The whole question is under discussion and observation by every one, and we should be content to make progress very carefully, even if slowly.

In reviewing my own observations in these cases, I have noticed that in many of them the removal of the appendix does not relieve, in fact I have had a number of disappointments after the removal of the appendix. In each of these cases the appendix showed changes within itself of chronic appendicitis, yet the patient got no relief.

In some of these cases therefore something more than the removal of the appendix is needed. However, I intended that my small contribution to the discussion should be along another line, although I can only touch on it very briefly. As a result of a long series of experiments, only partly published, we can show how some of the contentions of Mr. Lane may be sustained. Aside from what he has given us, we have shown without doubt that in the evolution of man one of the most important developments has been the protection of the body against the infections in the intestinal tube. To me one of the most striking facts in our evolution has been the maintenance of an aseptic territory in the abdomen itself, in spite of the fact that many poisons must be constantly absorbed from the intestinal tube. There has been evolved a powerful mechanism in the body for the purpose of overcoming that infection or poison which we call auto-intoxication and of mantaining the chemical standard of the body in all conditions. You will find that this mechanism consists of a group of organs—the brain, adrenals, the thyroid and liver. This chain of organs is able to split up and protect the body against these poisons absorbed from the intestine.

As to the working out of the practical value of this postulate we all will sense the danger of going too far and perhaps claiming that thus too many of the diseases of civilization which we only partly understand may be accounted for.

Dr. Hugo O. Pantzer, Indianapolis.—The forceful clear, convincing and enthusiastic paper given us by Dr. Bainbridge is certainly interesting and instructive. I had my say yesterday, but wish briefly to emphasize, namely, that essentially we have to deal with an intoxication or toxemia. What are the general symptoms of intoxication? The toxemia is not limited to the number of organs mentioned by Dr. Crile. Toxemia by any cause, be it suppuration of the tonsils, decaying teeth, tuberculosis, intestinal stasis, or whatever, toxemia spells *glandular blight*. Both secretory and excretory glands are involved. This blight varies in the degree in which the various glands become involved in individual cases. Thus one case reveals accentuation of kidney involvement, others mark greater thyroid, or liver, or skin involvement, etc.

The withered liver in these cases, revealing a percussion limit at times not more than two fingers in breadth in the axillary line is an interesting observation as yet not chronicled. Under proper medical treatment such a liver will regain its size, and the stools, previously light yellow or even clay colored, will resume normal shades. My observation of such cases goes back fifteen or twenty years.

The study of the symptomatology of toxemia is greatly simplified if we first recognize it to mean a blight of the glandular organs, then ferret out the organs more especially suffering, and finally attempt to locate the focal cause or causes. In the search for the latter the entire body shall be scrutinized.

Dr. J. Henry Carstens, Detroit.—Dr. Bainbridge has presented this subject in a beautiful and admirable manner. There are several points I would like to consider. We were taught, more or less, to pride ourselves on the inch and one half incision, and a week and a half in bed, in connection with operations for appendicitis. I have followed that very largely and am still inclined to make small incisions for all kinds of operations, but in the course of time my patients got well and I began to hear about Lane's kink, and now I find that a great many Lane's kinks are found around the cecum, and when I operate for appendicitis, if it is a plain simple case, I always make an incision large enough so that I can *thoroughly explore the surrounding cecum* and see if there are any Lane's kinks interfering with the function of the small intestine or the ileocecal valve. That is one point.

The other point is this: people have constipation and intestinal stasis. I have seen some patients whose bowels did not move for two or three weeks. They had tried Christian Science and a lot of other things, and yet their bowels would not move, and I had to scoop them out, and they did not suffer either from intestinal stasis or Lane's kink. Those people seemed to be in ordinary good health even if their bowels did not move. It is not only constipation and retention of fecal matter but there must be something else. Some of them had evidently great resistance to the absorption of excrementitious matter, and others had not, and they suffered. It seems to me, that ordinarily in the human economy there is great power of resistance, and when a patient has a sound or healthy epithelial layer of the mucous membrane, he or she does not get any of this absorption. There must be somewhere some weak point in the epithelial layer to permit of this absorption, or there must be raw surfaces produced by the food that causes a place where absorption occurs, and you have a peculiar condition of diapedesis of the microorganisms in the intestines into the peritoneal cavity to cause formation of these adhesions.

There is another point that our internal medicine friends speak about and that is joint troubles. In other words, we have all kinds of arthritides, and finally they come to the conclusion that these cases are really infectious. I hold that the infection in all these chronic joint troubles that we run across is caused by these kinks and intestinal stasis and the absorption is the result of those, and those patients who have repeated attacks of joint troubles should not only have the joints examined and *x*-rayed, but they ought to have their abdomens examined and *x*-rayed, and ought to be in the hands of a surgeon instead of in the hands of a general practitioner.

Dr. Frank D. Gray, Jersey City.—Far be it for me to criticise this most excellent exposition, but in listening to the paper I got the impression that Dr. Bainbridge had a method by which he could

diagnose these cases without radiography, and as I followed the paper through, the only answer to that, as far as I could see, was that he diagnosed his cases after opening the abdomen and found certain adventitious bands and certain kinks.

I am willing to admit that some of us are not capable of making that thorough diagnosis after we have the abdomen opened, because we may overlook conditions or fail to properly interpret them.

A point I would like to have Dr. Bainbridge elucidate in closing the discussion is, was I right in my supposition that the diagnosis was made by an exploratory operation, and if so, how many cases were submitted to exploratory operation in which these things were not found?

Dr. David Hadden, Oakland, California.—There are two or three questions I would like to ask Dr. Bainbridge. First, whether he considers general colon infection as a secondary condition to the stasis or as the cause of the stasis? Second, personally I have been impressed with the small number of cases I have seen with the rather large proportion of positive complement fixation tests in these cases, and I would like to know in what proportion of his cases there has been specific infection, and how far that may go toward producing these bands and kinks in these cases?

Dr. E. Gustav Zinke, Cincinnati.—A more important subject than the one presented by Dr. Bainbridge could hardly have been brought before the association at this time. It is a subject that is more prominently before the profession at this moment than any other. When the Clinical Congress met in London last July, I think Mr. Lane was the principle attraction on that occasion. Everybody wanted to see him. Everybody saw him. We were all much interested in him and his work. An evening had been set aside for the discussion of intestinal stasis in which the shining lights of England and America participated. The fact, however, that Mr. Lane attributes nearly all the ills, to which human flesh is heir, to intestinal stasis, embarrassed many of his friends and lessened the effect of his teaching. They gave Mr. Lane credit for his originality, for his investigation, and for his honesty. Nobody entertained any doubt but what he had opened up a new field for investigation. None listened to Mr. Lane in his clinic without being convinced that Mr. Lane is going too far in his views as to the consequences of intestinal stasis. This was vividly illustrated in one case he brought before us: A woman, about forty-five years, was brought into his clinic for the purpose of removing her colon. Preceding the operation, as he always does, with an investigation or examination of all the other abdominal viscera, he found the gall-bladder full of gall-stones, so much so that this organ could be seen by all who had a view of the abdominal wound. Mr. Lane had the gall-bladder in his hand, showed it to his visitors and told them it was filled with gall-stones. He said, "I will not bother about these gall-stones. I will simply remove this patient's colon. The gall-stones will take care of themselves." He did just what he said.

Sir Lane has a strong personality. He has many admirers and is,

unquestionably, a man of great merit. I have read, carefully, all he has written, on intestinal stasis, its causes, consequences and treatment; and yet I cannot help but think, like the majority of those who had the opportunity of seeing him at work and listening to him at London during the Congress, that he has probably gone far beyond the line of demarcation of intestinal stasis in all of its phases.

Dr. William Seaman Bainbridge (closing the discussion).—I am very glad that my paper was postponed until this morning; we would not otherwise have had Dr. Crile's able discussion. I am glad to hear from him on this subject and to know that he is, as he says, working out something which will clear up some of the vexed questions concerning stasis. He is always accomplishing something which is not only new but most interesting and helpful. I feel, as he does, that looking at the body as a whole is the key to the entire situation.

Replying to the remarks of Dr. Carstens concerning constipation, I would say that there may be a certain amount of residual feces, just as there is of residual urine. There may be kinks without stasis, and there may be stasis without kinks. There may be stasis with constipation, there may be diarrhea with stasis, and there may be diarrhea and constipation at the same time. In some cases there is extreme constipation, as has been stated to-day, with no absorption from the bowel which is a detriment to the body as a whole.

I have examined athletes whose intestines were filled with a large amount of material, I have had them exercise for hours, finding pronounced kinks, as shown in the bismuth picture. The *x*-ray is certainly of great value when rightly interpreted, and I am not decrying it as a real aid in diagnosis. At the recent meeting of the American Roentgen Ray Society, at Cleveland, in a series of cases I reported, from 80 to 90 per cent. of all essential details were shown by the *x*-ray in conjunction always with the fluoroscope.

In replying to Dr. Gray's criticism regarding the diagnosis, I would like to ask him in how many cases he makes an absolutely accurate diagnosis before the abdomen is opened? In 40 per cent. of the cases of abdominal cancer in the Metropolitan hospitals of London the diagnosis is not made until the abdomen is opened at the operating or postmortem table. I fear we, as a rule, do little better. Many laparotomies are really exploratory. When we make clear that the condition demands that the abdomen be opened, the details are very often discovered afterward. In each of the cases reported the diagnosis was chronic intestinal stasis—sewer-gas poisoning, defective plumbing. In each case there was something that could be accounted for by no other hypothesis. Most of the patients had been under the care of an internist for from five or six months to several years. The urine was examined, a Wassermann was taken, and the cases were studied carefully, every effort being made to effect a cure without surgery. Laparotomy was resorted to after medical means had failed or clearly would not be sufficient.

With reference to the causes, I will say briefly that whether the colon bacillus is found wandering out primarily or secondarily is a debatable matter. Lane believes, as do several other leaders, that the colon bacillus comes out when there is stasis, and is therefore secondary. Others hold the opposite view.

Referring to Dr. Zinke's remarks, I have no doubt that Lane has gone too far in what he said. He has gone further in what he has said than in what he has written, and he has doubtless gone further in what he has written than he will believe in the end. If he has gone too far it is because he has been leading the way. I have heard him say that he does not know where it will all lead us, and that as an initiator if he does not somewhat overstate things the profession will not listen, and humanity will not have the great benefit which this question seems to offer.

Perhaps nineteen out of twenty patients with stasis should never have operative treatment. The cases for surgery must be carefully selected and the type of operation be wisely chosen.

The great truth which Lane has brought to us is the consideration of human drainage—the plumbing of the house in which we live—as essential to health and as an active factor in a large number of human ills. He has opened the door of hope to many a human wreck, and has laid down a plan for the prevention of much disease and misery. The important point is not whether Lane has gone too far—the question is, has he led us on?

THE KINETIC SYSTEM AND THE TREATMENT OF PERITONITIS.

BY

GEORGE W. CRILE, M. D., F. A. C. S.,

Cleveland, Ohio.

Introduction.—It is my purpose in this paper to present a new explanation of the phenomena which accompany peritonitis and to outline the treatment suggested by this conception. In the abdomen the leading symptoms of peritonitis are pain and tenderness, distention, muscular rigidity, intestinal paresis, vomiting. In addition to these local disturbances there are also the general symptoms of infection—accelerated pulse and respiration, raised blood pressure, fever, and rapid loss of strength and weight. I postulate that these are all adaptive phenomena—that is, that each individual phenomenon of peritonitis has been evolved for the good of the individual. In other words, the whole process is for the purpose of defense against injury just as truly as physical fighting is for the purpose of defense against attack. In like measure physical fighting and the body's defense against peritonitis are dependent on the transformation of potential energy into kinetic energy, this transformation being effected by the kinetic system. In peritonitis as in the case of a physical attack the defense may require so rapid and so extensive a transformation of the body's stores of energy that exhaustion, or death even may follow. It follows, therefore, that in peritonitis as in fighting or in any form of physical exertion safety may lie in the control of the kinetic system.

Analysis of the Phenomena of Peritonitis.—As the abdomen has within it a germ-laden intestine, and as it was a part of the body that was frequently wounded in man's phylogenetic struggles with his environment, the peritoneum, perforce, through natural selection acquired a remarkable power of self-defense against the consequent infections. As an infection is most readily spread and increased by movement, immobilization is the prime requirement in overcoming an infection. Within the abdomen this immobilization is accomplished (*a*) by inhibition of the intestines; (*b*) by distention of the intestines; (*c*) by rigid and persistent contraction of the abdominal muscles and (*d*) by the exudation of a sticky glue-like material. The infected point in the peritoneum may there before completely fixed (*a*) by paralysis, (*b*) by distention, (*c*) by rigidity of the abdominal wall, and (*d*) by gluing. On account of the intestinal inhibition,

digestion and absorption cease and anorexia and vomiting follow—self-protective measures which have been evolved against the danger from poisonous broken-down food.

We see, therefore, that the paralytic distention of the intestines, the muscular rigidity of the abdominal walls, the anorexia and the vomiting which accompany peritonitis are natural adaptations for the purpose of localizing and overcoming the infection. As for the pain and tenderness they are part of the protective mechanism and play their rôle by forcing the body to maintain a box-like rigidity of the abdominal portion.

When the abdomen is rigid it can no longer play its important respiratory rôle, and the respiratory movements are confined to the thorax—in fact, the lower thoracic movements also are inhibited since the movable ribs are fixed on the abdominal side. As the lungs are but partially filled, the respiratory rate is increased to compensate for the diminished volume of the exchanged gases. The diminished respiratory movements of the lower chest induce vascular congestion; vascular congestion induces pleurisy and pneumonia.

The loss of water by vomiting, the diminished intake of water, and the failure of water absorption cause a rapid shrinkage of the soft parts which is especially noted in the face, while the increased blood supply to the intestines combined with the diminished intake of water causes a rapid diminution of the pulse volume. The loss of water is followed also by a diminished volume of urine. At the same time metabolism is increased, there is an increased concentration of solids which cannot be eliminated by the kidney handicapped as it is by the diminished urinary output. The skin in turn, therefore, is forced to attempt by increased activity to compensate for the renal insufficiency.

We see, therefore, that the *characteristic* phenomena of peritonitis are as natural as the phenomena of walking, running or fighting. The increased pulse and respiratory rate and the fever are characteristic not of peritonitis alone but of all infections. They are the result of the *forced* conversion of potential energy into kinetic energy as a defense. This defense also is an adaptation developed in the body by natural selection and is the means by which foreign proteins—infection products—are broken down.

The Treatment of Peritonitis.—If the body-wide disturbances caused by peritonitis are adaptations for defense, then we must conclude that death is caused by an excessive discharge of the body's store of energy in maintaining this defense. Our problem, therefore, must be to discover some means by which the method of defense

evolved by nature may be maintained, while at the same time the energy of the body is conserved as far as possible.

The evidence upon which we base our postulate that the excessive transformation of potential into kinetic energy is the cause of death in peritonitis points the way to the method by which the energy may be conserved:

(*a*) In experimental researches my associates (Drs. J. B. Austin, F. W. Hitchings, H. G. Sloan, and M. L. Menten) and I have found that infection produces in the brain, the suprarenals and the liver histologic changes which are identical with the changes which are characteristic of exhaustion from any cause—running, fighting, trauma, etc. Exhaustion from any cause, as we have shown elsewhere, is invariably accompanied by widespread histologic changes in these three organs—the brain, the suprarenals, and the liver—these changes, according to the degree of exhaustion, varying from slight hyperchromatism through stages of chromatolysis to a final stage of disintegration.

(*b*) Our experimental researches have shown us also that deep morphinization prevents the histologic changes which are characteristic of the excessive conversion of energy—that is, of exhaustion.

Not only is the conversion of energy excessive in cases of peritonitis but, as we have stated already, the intake of energy in the form of food fails so that the stores of energy are depleted with great rapidity, while the action of the kinetic system is still further impaired by the loss of water equilibrium.

These facts point the way to two prime requisites in the treatment of peritonitis—(*a*) the conservation of energy by the use of morphine and (*b*) the maintenance of the water equilibrium by the Murphy rectal drip.

Morphine not only protects the organs but it also aids in promoting the efficiency of the defense mechanism within the abdomen—for deep morphinization of itself causes inhibition of the intestine; immobilizes the patient as a whole; prevents pain; and holds metabolism practically at a standstill. Under deep morphinization but little food is required; the brain, suprarenals, and liver are protected; and the intestines are immobilized while the phagocytes overcome the infection.

That deep opium narcotization is an efficient treatment for peritonitis was well known to the older clinicians, especially to Alonzo Clark and to Flint, who gave opium until the respirations were far below normal, as low even as ten or twelve per minute.

The appearance of these patients would seem to indicate that they

are perilously near death; in reality, they are in a condition which closely resembles hibernation, and which continues until the local immunizing forces overcome the infection.

In cases of appendicitis with spreading peritonitis the surgeon should never in the whole scheme of treatment lose sight of this prime need of protecting the kinetic system from exhaustion. The administration of morphine should, therefore, begin at once. Nitrous oxide is the inhalation anesthetic of choice as ether by dissolving the lecithin in the phagocytes causes a weakening of the body's defense which may last from twelve to twenty-four hours—a break in the defense which may cost the life of the patient. The operation is performed under anoci-association, the local field being blocked as far as the zone of the actual infection.

Morphine is continued during and after the operation as it is required to conserve the patient's energies. My associate, Dr. Lower, and I have employed this method in 391 cases of acute appendicitis with but two deaths.

We may define peritonitis as the adaptive phenomenon manifested by the kinetic mechanism in maintaining a defense against an infection of the peritoneum, and we find that the kinetic theory supplies a consistent explanation of the phenomena of peritonitis and also a true index to its successful treatment.

DISCUSSION.

Dr. J. Henry Carstens, Detroit.—As one of the older men in the profession, I have always had great admiration for Alonzo Clark and his method of treatment. During all these years, in spite of the opposition to opium, I have still clung to the Alonzo Clark treatment. I have had many cases of peritonitis that would have died if operated on and have put them under the Alonzo Clark treatment. The Alonzo Clark treatment was not simply the use of anodynes. I firmly believe that you will have a great deal better effect from the real, original *powdered opium or gum opium* than from morphin. From pure opium you will have a beneficial effect that you would not get from morphin alone. If you cannot get this and give it, you must give enough morphin, but I have practiced in accordance with the plan laid down by Alonzo Clark. You hardly can give too much. I have seen house physicians throw up thier hands in horror if they saw me give a grain of morphin every hour, or something like that, but I can assure you that it is all right.

Dr. Frank D. Gray, Jersey City.—I want to say one word. It is most delightful to have Dr. Crile throw such scientific illumination upon the good things of the old empirical times.

Dr. William H. Humiston, Cleveland, Ohio.—I have been very much pleased with this paper. It is an important contribution, and I think the conclusions are absolutely correct. I have for three

years been taking these cases of acute peritonitis and waiting until subacute, before operating. In the meantime giving them opium, to control peristalsis with ice bag to abdomen.

One important point the essayist spoke of was the contraction of the muscles of the abdomen, holding the viscera quiet, aiding the opium. I further aid this by the use of the ice bag which will contract these muscles, and with opium, hold over these cases to a time when you can operate safely. I would call Dr. Crile's attention to a case we both saw recently. I refused to operate, put her on the ice treatment. Friends became restless and Dr. Crile was called on. He properly refused to operate and advised to keep on with the treatment. Operation seven weeks later, and the woman recovered. It was a desperate case as Dr. Crile will remember. I have had many cases of this kind in the past year and a half, and my experience confirms everything that Dr. Crile has said to-day.

Dr. Julius H. Jacobson, Toledo, Ohio.—I would like to ask Dr. Crile if the Alonzo Clark treatment is used before operation or after the patient has been operated. I think that is very important.

Dr. A. B. Miller, Syracuse, New York.—It is interesting to find Dr. Crile has reached his conclusions after a scientific study of the subject. It is the consensus of opinion of those members of the profession in New York who are familar with the method of treatment carried out by Dr. Alonzo Clark, that his original work was not accurately reported; that the interns associated with Dr. Clark at the time felt that the better results were obtained by means of catharsis and that it was really the treatment to be carried out, and it is probable in the investigation of Dr. Clark's method we have not been furnished with a true statement of the treatment as it was carried out by him. Gill Wylie was an intern at the time and he says the line of treatment by catharsis was adopted and the most favorable results obtained.

Dr. Crile (closing).—In answer to the question of Dr. Jacobson, I will say that we operate on every case at once.

I remember the case to which Dr. Humiston has referred very well, and it was a splendid triumph for Dr. Humiston. I think if Dr. Humiston had used cathartic treatment he would have lost his patient. Don't you think so?

Dr. Humiston.—Yes, I do.

Dr. Crile.—What we do is this; as soon as a patient arrives at the hospital, she is carried in a propped up position from the ambulance, the Fowler position being used, and is taken into the hospital and brought to the operating room. We operate immediately under nitrous oxid. If it is an appendix case we take out the appendix if we can, but we do not push the operation. It may be necessary to drain for a short time. If the patient is very sick we give the Alonzo Clark treatment, but not if the patient goes along smoothly, that we may save some of the worst cases that otherwise would succomb.

As to the remarks made by Dr. Miller, I have no definite knowledge of the Alonzo Clark treatment, as it is understood by the New York men. I wish I had.

ECTOPIC PREGNANCY AND THE GENERAL PRACTITIONER.

BY

BENJAMIN RUSH McCLELLAN, M. D., F. A. C. S.,

Xenia, Ohio.

THAT extrauterine pregnancy is far more common than is generally recognized requires little argument. Hunner records thirty-six cases in 3300 patients examined in the gynecological service at Johns Hopkins Hospital, and in a series of 2100 private cases of pregnancy he found thirty-four ectopics.

In a community well known to the writer, there are forty-eight able general practitioners, very few of whom have ever reported a case of extrauterine pregnancy; however, two of their number each report from two to five cases every year. In this same community there have been a number of deaths, and many chronic invalids reported to have had pelvic hematocele and pelvic abscesses following abortion, many of which were primarily, no doubt, overlooked extrauterine pregnancies.

The writer feels sure that the time has come when the general practitioner will be held responsible for an early diagnosis in these cases as well as in appendicitis and other well-known acute abdominal diseases. Are not members of this and similar organizations to blame, in part, in that there has not been a definite and clearly established "symptom-complex" that would enable the general practitioner to make a reasonably early diagnosis?

I quote further from Hunner who, in commenting on the fact that early diagnosis of ectopic gestation is not always easy, says: "there is no serious intraabdominal condition which has the diagnosis written all over its face more clearly than has extrauterine pregnancy, and at the same time there is no condition which has been more often overlooked."

Of first importance is a careful case history. This should reveal at once any record of previous pelvic disorder. Mackensie, of London, says that at least 16 per cent. of all cases give such a history. This is easy to understand when we remember that the recognized etiological factors are, according to Keyes, "inflammatory diseases which leave impaired functionating mucosæ and impaired peristalsis; conditions which offer mechanical obstruction to the gaining of the uterine cavity by the ovum, as tumors, kinks, strictures,

occlusions, etc.; dense adhesions of the tube to the ovary, uterus, broad ligament, or intestines, which distort the lumen of the tube; congenital malformations, especially diverticula of the lumen where an ovum is likely to be arrested; and uterine myomata." The history of a long period of sterility is quite common and would naturally make us suspicious of a previous pelvic pathology.

Cessation of menstruation occurs in about one-half of the histories, and in itself will not often send the patient to a physician. However, if the patient should mention the fact that the missed period was followed by an unexpected and unnatural appearing flow, it should arrest attention at once, especially if the flow is described as dark in color, more or less ropy rather than clotted, and accompanied by keen pains.

Nausea and morning sickness are not often noticed during the early weeks of pregnancy, and therefore, are not very helpful signs; however, there is a small number of cases accompanied by vomiting, in which the history of previous inflammations about the appendix might throw one off guard, thinking it was an acute recurrent attack of appendicitis.

Changes in the vaginal mucosa and the cervix uteri are less pronounced than in uterine pregnancy. The uterus is somewhat enlarged, but is not equal to that of the normally pregnant uterus at the same period of gestation.

Probably the most important sign is the finding of a *small, very tender mass* between the uterus and ovary, associated with intermittent pains, sharp in character, which radiate from this point to the back and thighs. Huggins calls attention to the fact that "traction of the cervix usually produces great pain." This test has never been tried by the writer, but it commends itself as a valuable aid, taken of course in conjunction with other symptoms.

Out of the foregoing enough should be recorded to enable the general practitioner to form a fairly clear clinical picture of an ectopic pregnancy before rupture, which should lead to prompt surgical intervention with a prognosis as good as an *adinterim* operation for appendicitis.

Huggins thinks that at least 80 per cent. of all cases coming to the general practitioner should be diagnosticated before rupture; certainly this is far from true at the present time. He further says that not more than 70 per cent. of women seek advice before rupture. Surely some effort should be made to instruct women as to the importance of noting even slight deviations from normal during the first weeks of pregnancy.

Unhappily a certain large percentage of cases are not diagnosed until the tube ruptures. This may occur at any time from the second to the fourteenth week, but is most apt to occur during the second month. This symptom is sure to be ushered in by a severe lancinating pain, quite unlike anything before experienced. So distinct is it that one who has once had the experience has been known to diagnose her own condition when a recurrence has taken place on the opposite side. This is followed by less severe but colicky pains, and more or less uterine hemorrhage. At this stage a diagnosis can usually be made without much difficulty, and without a vaginal examination. Indeed this last is contraindicated immediately after rupture, lest the newly formed clot should be disturbed.

It seems most desirable that an established propaganda should be formulated which would serve as a guide to the treatment to be followed in this so-called "tragic stage." It will not do for some to adopt the rôle of "watchful waiting," while others say operate as soon as a diagnosis is made. It seems to the writer that surgeons do not differ so much in what they themselves do as in what they say should be done. If the general practitioner takes the dictum "to wait" seriously, he will delay the calling of a surgeon, on the assumption that a fairly large per cent. of cases get well without operation, which, of course, can only result in a needless loss of life.

On the other hand, there is sure to be unnecessary risk taken if every case that has gone on to rupture is operated regardless of the state of collapse, and without waiting for the helpful effects of wisely selected treatment, which will of course include perfect rest with morphine wisely given, warmth to the body, and careful stimulation of the vasomotor system with small doses of strychnia, remembering that salt solution infusions should not be given until hemorrhage has completely ceased. It seems equally clear that if called to a case where hemorrhage is persistent, quick operative intervention is advisable, as offering by far the best results. If hemorrhage has evidently ceased, then the operation can well be done without haste. Indeed, if the environment is not favorable, time may be taken to change this, or even transport the patient carefully to a hospital.

In view of the fact that approximately one in five of the women who have extrauterine pregnancy on the one side have a recurrence on the opposite side, the question of prophylaxis is very important and should be settled by discussion in this and similar organizations. It seems quite clear that if the woman is young, and the opposite tube is, to macroscopic appearance, healthy, then the surgeon's

duty is to preserve it. If the woman is near the climacteric, and there is any doubt as to the health of the remaining tube, it should be removed. But there will be a variety of conditions between these extremes that will present more difficulty of solution, in which it seems to the writer that the patient and her husband should have the deciding voice.

Finally, the writer would like to emphasize the value of the operating room as a teaching place where the general practitioner can be given most impressive instructions in pathology as it occurs in the living body. In no other way can the clinical picture be fastened so well in the observer's mind. Here are four recent experiences which illustrate some of the different phases in diagnosis and treatment.

Case I.—Mrs. H., thirty-six years old, four children, the youngest nine years old, no miscarriages. First confinement very difficult, requiring instrumental delivery, followed by a tedious recovery, with persistent pain in region of the right ovary. Menstruation quite regular till finally one period was missed, and at the end of six weeks she had an unexpected flow of dark ropy blood accompanied with sharp stinging pain on the right side. The family physician prescribed rest in bed. The flow stopped for two weeks, then recurred. About this time there was a chill followed by fever and profuse sweating. In this condition, with pulse 120, temperature 101°, she came into the hospital under the writer's care. Vaginal examination revealed a firm dense mass filling Douglas' culdesac; no fluctuation, and no fluid could be reached per vaginam. The abdomen was opened and emptied of a very large, firm, but foul clot. Free drainage was made both above and below, and the patient made a slow but excellent recovery.

Case II.—Mrs. T., twenty-eight years old, married seven years; never before pregnant; menstrual life began at fifteen, always painful and irregular; amenorrhea for two months, at which time she had, first a sense of fulness and uneasiness low in her pelvis which soon amounted to a pain so severe that she called in a physician who put her to bed and gave morphine. Her condition continued with varying degrees of pain till at the end of the tenth week she was awakened at 3 A. M. by a severe sharp cutting pain. Her physician found her in extreme collapse, from which she was sufficiently recovered in a few hours to allow of careful transportation to hospital. Soon after her arrival, a fresh hemorrhage occurred, pulse 140, anxious expression, skin pale, cold and clammy. Abdominal section was quickly done, vessels secured, saline infusion given, rapid emptying of clots and fresh blood with small fetus; wound closed without drain. Rapid recovery; patient leaving the hospital on the sixteenth day.

Case III.—Mrs. B., forty-one years old; married at sixteen; two children, the youngest sixteen years of age, miscarriage four years

ago; four weeks after last period, while away from home on a visit, had sharp pain and a very slight discharge of blood. This occurred in the night; did not call a physician; by morning she was enough better to ride home in the auto, a distance of forty or fifty miles; two weeks later, an unusual dark flow began, and continued with a little pain for two weeks, at which time a very severe pain necessitated the help of her physician who quieted her pain with morphine and sent her to the hospital. Patient was in good condition; pulse 96, temperature normal. Diagnosis ectopic pregnancy. Usual abdominal section on the following day revealed a large hematocele completely filling the opened out broad ligament on the right side. It was easily removed and the patient made a very prompt recovery.

Case IV.—Mrs. T., thirty-six years old; married fourteen years; three children, the youngest six years of age; no miscarriages. No history of pelvic disorders; menstruation quite regular till about six months ago when the flow was very scant and there was sharp pain in region of left ovary followed by persistent sense of fullness and weight in same region; was unable to be on her feet long at any time. August 6, she had a sudden very severe pain in this same left side, very low, with desire to go to stool. In a few days there was a chill followed by high fever and profuse sweating, extreme prostration, pulse 140 and feeble, temperature 103°. Douglas' culdesac and left iliac fossa filled with firm mass; no fluctuation. Drainage through posterior fornix was unsatisfactory, whereupon abdomen was opened and revealed a large disorganized hematocele which was so badly broken down that no attempt was made to remove it. But very free drainage was established, one per vaginum, one through lower end of abdominal incision. Immediately the patient began to improve, pulse and temperature reaching normal on the third day, and at the end of four weeks the patient left the hospital.

Cases I and IV are reported as overlooked extrauterine pregnancies which became infected and thereby not only placed these lives in greater jeopardy but added greatly to the chance of unnecessary invalidism—contrary to the accepted rule the abdomen was opened in each of these infected cases. This was done because of inability to secure satisfactory drainage per vaginam. Case II illustrates the importance of prompt intervention where hemorrhage persists. Case III was a typical hematocele due to the pregnant tube rupturing into the broad ligament, and which, recognized early, was easily removed, and thus stands quite in contrast to Cases I and IV.

DISCUSSION.

Dr. Julius H. Jacobson, Toledo, Ohio.—The point in the discussion of this paper which we should emphasize is, to impress the general practitioner with the fact that there are two clinical courses for ectopic pregnancy, first the classical type which I think every general practitioner recognizes, and secondly that there is an atypical

type which is not as a rule recognized. If we ask a general practitioner what the classical signs and symptoms of ectopic pregnancy are, he usually knows; but if we ask him something about the atypical types he knows very little about it, for this reason, we as surgeons get the impression that ectopic pregnancy must occur much more frequently than is indicated by the number we operate upon.

The atypical cases from a pathological standpoint come under the form of the old-fashioned tubal abortion, that is, little hemorrhages which come out through the fimbriated end with the formation of hematocele or hematoma. There must be a great many cases of unrecognized tubal abortion or pelvic hematoma which go on to absorption and recovery of the patient.

Dr. William H. Humiston, Cleveland, Ohio.—I merely rise to commend this paper and the clear points brought out in connection with the diagnosis. We cannot emphasize too much the importance of a good, clean cut history. A carefully obtained history, supplemented with a pelvic examination will readily clear up these cases.

I wish to report an unusual case which gave me a great deal of concern, and one in which I was in doubt as to proceeding, or whether to refuse operation under patients restrictions. A woman, married five years, came to me four years ago. I found on examination she had a retroverted uterus, an enlarged cystic right ovary, with evidences of chronic appendicitis. I did a curetment, opened the abdomen and removed the appendix, and also removed the right cystic ovary. The left ovary was also partly cystic but not so large. I resected that ovary, leaving about one-half of the organ, carefully uniting the cut edges with fine catgut, and to close did a Gilliam operation. Following these operations, her backache disappeared, and her headaches and indigestion were relieved. She gained 20 pounds in weight. About three months ago, she was taken suddenly with pain in left iliac region. She had missed one menstrual period. A physician was called, who did not make a diagnosis. To relieve the pain he gave her morphine and applied hot applications. As she was no better the next morning, she called in a brother, who was a surgeon, and he suspected extrauterine pregnancy, with threatened rupture, and advised operation. She decided that if she had to undergo an operation she would go back to the hospital and have me do it. Accordingly, she was brought to the hospital in an ambulance; her pulse was not over ninety and temperature was normal. She had no usual symptoms of hemorrhage, but on examination I found a boggy mass to the left and the uterus was deviated a little to the right. I diagnosed a ruptured ectopic pregnancy and advised an operation at once. She said to me, "that means the loss of my ovary; you have taken out one and I can never have any babies. Her husband would not consent to an operation unless I could save the tube and ovary, so that she might have a child. I thought it over and told them I would make the operation, control the hemorrhage, and if possible save the tube and ovary. On opening the abdomen fully a quart of blood was found in the lower pelvic cavity, which was removed. The tube was uncovered, and it

was slit on the superior surface for an inch and a half, and the ovum partially protruding and still bleeding was easily removed. The ovary was covered with clotted blood. I uncovered it and it looked fairly well. I placed a probe in the fimbriated end of the tube, and with No. o catgut I carefully united the ruptured tube with two layer sutures. I was some nervous about it. I put the patient to bed, put on an ice-bag, and she has made a splendid recovery. I hope that I may be able in the next year or two to report to you that she has become pregnant and delivered of a normal child.

Dr. Hugo O. Pantzer, Indianapolis.—I am sure this forceful presentation of this subject will impress upon the general practitioner the importance of differentiating in intraabdominal lesion the inflammatory from the noninflammatory affection. In doing this the rectal temperature should be taken as meriting the quality of a real guide. In the acute stage of appendicitis, notably gangrenous appendicitis, the oral temperature may be normal or subnormal, while the rectal temperature will show an elevation at times of two to four degrees above that of the mouth. Thus the finding of increased temperature at once differentiates the case from one of bursted tubal pregnancy, which latter goes without temperature, at least until the extravasated blood undergoes infection and absorption.

I have attempted conservation of the tube by amputating the involved distal end and stitching the margin of the retained end to the ovary.

Dr. Albert Goldspohn, Chicago.—I am heartily in accord with what Dr. Jacobson has said, that we should educate the general practitioner who brings these cases and let him appreciate the difference in pathology between a tubal abortion and a ruptured tubal pregnancy, because it makes the biggest possible difference in the severity of the symptoms. I am not altogether decided in my mind positively that we should absolutely operate at once every one of these extremely bad cases of real rupture, particularly where the patient is pulseless, the temperature normal or below normal in the rectum. The fact that a great majority of the tubal pregnancies get into the hands of gynecologists after they have been carried for a day or longer for various reasons, is an important one, as we see the patients first after they are in the hospital. Bleeding may have stopped in many of them. They are not pulseless. We can make a diagnosis of tubal pregnancy and may not be altogether certain that there is not an abscess. The majority of cases we get come to us when the bleeding apparently or really has stopped, and the patient would not die with good medical care, the use of opium, etc. They would not get well; and operation would have to be done later, in most of them, but they would not die now. On the other hand, I know personally of two deaths, both of which occurred over twenty years ago, not under my care, but under my observation as consultant. These patients died in their homes. Nothing was done to them. They simply expired from hemorrhage, so that death is possible. We cannot assume that the natural course of the thing does not kill.

Within one week, five weeks ago, I had two cases, both of which were pulseless. Nobody could make out any pulse on the operating table, and they had all the other conditions that go with severe internal hemorrhage. I operated at once and as quickly as possible, instituted vaginal drainage to close the anterior wound. These cases rallied; they had a pulse within six hours after operation, and did all right after that. I rather favored that as the correct thing to do, since we know that intraperitoneal bleeding is not always from tubal pregnancy, but it comes from a ruptured corpus luteum or a degenerating follicle, and sometimes from varix of the broad ligaments. If these are the conditions and it is not tubal pregnancy, the chances of the patients dying may be even more than from tubal bleeding. So inasmuch as we are not absolutely certain in many cases whether it is really tubal pregnancy or some other sort of bleeding that may not stop spontaneously, I have operated on these cases at once provided they can be gotten into the right place. I do not think it is wise to operate on these patients in their homes amid unhygienic surroundings.

Dr. Frank D. Gray, Jersey City.—I wish to cite a matter of record which I think throws a bright light on this somewhat unfortunate condition. A few years ago Dr. Philander A. Harris, of Paterson, New Jersey, reported at the State Medical Society twelve consecutive cases of removal of unruptured tubal pregnancies. Some one was skeptical as to how he really knew they were pregnancies, and he volunteered to have them sectioned before the next annual meeting. This was done, and a report from a competent pathologist was that they all proved to be real tubal pregnancies. This shows the alertness not only on the part of the surgeon but inferentially on the part of the general practitioners who referred these cases to him.

In the next place, I wish to call attention to the fact that we must not allow evidence of recent intrauterine abortion to blind us to the possibility of a coincident tubal pregnancy. In the last two years I have had two cases referred to me with a history of intrauterine abortion within the previous two weeks, and in both cases, on operating, I found tubal pregnancy, so that these things do occur, but not often. The lack of typical symptoms should be borne in mind. Recently a woman presented herself to me who had been for three weeks under the care of a man who is rated as a good general practitioner. She had had a more or less constant, but slight, hemorrhage from the uterus. During that time he treated her for "ulceration of the uterus." He had gone on his vacation, and he said that if this did not subside within a week she was to see me. She had no typical symptoms of tubal pregnancy. There was simply this constant and rather trivial hemorrhage which on the day she came to me contained some shreds. She had had no pain or syncope. Vaginal examination revealed a small tender mass close to the right side of the uterus, and the fact she had been married a year and a half, had never become pregnant, and yet wanted a child, led me to suspect tubal pregnancy. I operated the next day and found it. There

were no symptoms of concealed hemorrhage, yet there was a quantity of free blood in the peritoneal cavity, beginning tubal abortion.

Dr. James F. Baldwin, Columbus, Ohio.—At the meeting of the American Medical Association held in Atlanta, Georgia, some eighteen or twenty years ago, during a discussion in the Obstetrical section, I reported five cases of ectopic pregnancy in which I had made the diagnosis and operated before rupture. That was just after the publication of Tait's book, in which he positively and repeatedly had made the assertion that diagnosis before rupture was impossible. At that same meeting Dr. Joseph Price, if I remember correctly, reported one case in which he had made the diagnosis before rupture, but rupture took place that night and he operated the next morning. My statements at that time were evidently accepted with some doubt, since one gentleman who was present wrote to the late Dr. Coleman, President of the Ohio State Board of Examiners, to find out from him whether my statements could be taken at their face value.

At the meeting of this Association held in Louisville, some fifteen years ago, I reported additional cases, my paper being based on eleven cases in which I had made the diagnosis and had operated before rupture. At that time I am happy to say that several gentlemen present reported one or two cases in which they had done the same thing, so that it was evident that my original report was doing some good. At the present time it is not at all unusual to hear reports of cases in which the correct diagnosis has been made before rupture and operation undertaken at once, but I think that I am the pioneer in this matter.

Why is it that general practitioners and surgeons—at least those who call themselves surgeons—are overlooking these cases so constantly? I had not been able to answer this question until recently, when I noticed an aphorism by Wundt which, I think, explains the matter fully. He says: "Men think very little—and very seldom." Of course they think they think, but in that they are clearly mistaken. Just an illustration: Years ago medical students were taught to give a purgative in cases of suspected appendicitis. The pathology of the day indicated that a quick acting purgative would unload the bowel, relieve the congestion, and cure the disease. At the present day all surgeons know that this is the worst possible practice, since the purgative greatly increases the danger of rupture, and with the rupture the diffusion of infection widely throughout the abdomen. We have been talking this for years, and yet how slowly has our advice been accepted. The general practitioners, at least large numbers of them, are still giving these patients calomel and salts, and when the surgeon is called the case, if not hopeless, is in much worse shape than it would have been without the purgative.

Papers like the one before us should be widely published and republished, and not limited to the American Journal of Obstetrics, or to our volume of Transactions. Such publications do not reach the general practitioner. Physicians must be instructed, as the

Bible says: "line upon line, precept upon precept, here a little, and there a little"; but ultimately the profession will learn to recognize these cases. But the embryo surgeon needs this information as much as the general practitioner. This has been impressed upon me over and over again. I was called not long ago to a hospital in a thriving town of 25,000 inhabitants, to see a woman who had been in the little local hospital for a week. The case was absolutely a typical one of ectopic pregnancy with rupture and infection. The case had been studied by the "staff" but no diagnosis had been reached, and they were very much surprised at the diagnosis which I made, which was verified promptly by operation, with prompt recovery. Again, a few weeks ago, a woman came into my office who had been seen by the "surgeon" connected with a hospital in a similar thriving town. He told her that he thought she was threatened with a miscarriage and made no examination. The diagnosis of an ectopic pregnancy was easily made and promptly verified by operation. In my own city a woman was under the constant attention of two well-known surgeons for two weeks; the history was typical, the local conditions typical, but yet no diagnosis was made. They evidently had not really done any thinking in that case. The general practitioner, therefore, is not the only one that is at fault. The surgeons must remove the beams from their own eyes before they seek to cast out the motes from the eyes of the general practitioner. We need more papers of the kind just read, and such papers should be read at meetings of general practitioners.

Dr. Channing W. Barrett, Chicago.—We have heard of the typical and atypical cases of ectopic pregnancy. I would be more inclined to say that there is a typical severe line of symptoms and a typical mild line of symptoms, and why we should speak of fifteen per cent. that have a severe line of symptoms as typical and the eighty-five per cent. that have a mild line of symptoms as atypical, I do not know. We have a perfectly typical picture of extrauterine pregnancy in patients who do not fall, become unconscious, and do not lose their lives. Cases presenting a mild line of symptoms, if carefully studied, are perfectly typical of extrauterine pregnancy the same as those who have a severe line of symptoms, but we never know when a patient who has had the typical mild line of symptoms will present a severe line of symptoms. Further we have no way of absolutely knowing that a patient who has a severe condition has stopped bleeding, or when it will return. Some say that operation is like amputating a leg when a patient is in profound shock from a railroad injury. We would not operate during such a shock. We have a way of knowing that hemorrhage has stopped in that case of injury to the leg, and we can wait for the shock to subside. But in the case of bleeding in the abdomen, we never know when the hemorrhage has absolutely stopped, and we may lose our patient by waiting for her to recuperate. I have not seen them die from operation in the severest of conditions. Generally they go on to recovery. I have had personal knowledge of mortality without operation.

Dr. McClellan (closing).—Just a word to further emphasize the importance of using every opportunity to teach the general practitioner how to diagnose these cases.

In Ohio we have a society of clinical surgery, and have learned to value its importance to the general practitioner. While this class of cases cannot often be demonstrated at a public clinic, yet it is possible to give many general practitioners an opportunity to visit our private clinics, and thereby fix in their minds the clinical picture as demonstrated by the pathology seen on the operating table.

Dr. Baldwin has well said the general practitioner must acquire his knowledge of ectopic pregnancy "line upon line, precept upon precept, here a little and there a little." So that we do him a distinct favor by our effort to give him opportunity to see these cases as treated by surgical intervention.

OPERATIONS AT THE HOME, WHEN AND UNDER WHAT CIRCUMSTANCES ARE THEY JUSTIFIABLE.

BY

J. E. SADLIER, M. D., F. A. C. S.,

Poughkeepsie, N. Y.

THE magnificent attainments of surgery during the past two decades, and the consequent saving of human life and suffering, have resulted largely from the proper appreciation by the physician, surgeon, and the people at large, of the great advantages to be secured, when operative procedures are carried out and surgical cases are treated in a well-conducted hospital. The advantages of such environment and care are so well understood by both surgeon and the laity as to require no argument upon my part, and the only qualification one would consider, in discussing the question, is as to the character and genuine worth of the particular hospital. For, as one author (Langdale) has properly stated, "The Lord only knows some of the results obtained in places masquerading under the name of hospitals." Yet, in due course of time, such institutions will settle to their proper level, and the increasing education of the people along surgical lines will demand proper attainment upon their part, or else relegation to the hospital scrap heap. Hence, they should constitute no argument against the fact that with certain exceptions —of which this paper has to deal—the hospital is the place where surgical cases can be studied, operated upon and treated along such methodical and proper lines as will, in the end, produce the least amount of mortality and morbidity. This fact has become so well understood by all classes of people that no longer is it difficult to get consent to have surgical cases transferred to hospitals, and as a result hospitals have increased in number and size until now not only our large and small cities throughout this great country, but many of the progressive country villages, are supplied with excellent little institutions for the care of the sick, both medical and surgical, occurring in their vicinity. Thus the proper development of the hospital idea and the known advantages of such institutions have gradually lessened the necessity for the home care of the surgical case, and the operation at the home should now be considered *only* when it has to its credit certain positive advantages which tend to

lessen the danger to the life or future health of the patient, and which advantages outweigh the gain to be obtained by treatment in a hospital. In thus limiting the field of home surgery, I am deeply conscious of the great pioneer work done in all classes of homes by such men as Sims, Price, Wyeth, and thousands of others who have followed their example, and accomplished great good to humanity, by proper surgical service in the home, and at a self-sacrifice which is known only to those who have done the work under similar conditions.

The medical literature of the latter half of the nineteenth century teems with articles referable to the home care of surgical cases, and much has been written during the past several years in relation to urgent surgery, such as accident, railway, army and navy surgery, and various acute surgical conditions; likewise, much has been said both in text-book and various papers upon the technic, preparation of home, and the after-care, including nursing of such cases. Yet, during the past five years or more, nothing has been written in English—or translated into English—under a heading that suggests the justification for operation at the home when hospital facilities are obtainable, and are either reasonably near or accessible by train, or that newer method of transportation, the automobile.

Yet, after making due allowance for greatly increased hospital facilities throughout the country, for improving conditions of highways over which patients are transported, and for increased rapidity of transportation, we must be mindful of the fact that even in our most populated counties there are many people living from twenty to thirty miles distant from any hospital, and that among them, as well as those living nearer by, severe acute calamities arise which must be rapidly met and in a manner calculated to produce the lowest possible mortality. A modest number of such conditions are of such a nature as to be influenced adversely by transportation, even though done, as it seldom is, in the best possible manner, and in such cases it is my judgment that instead of the patient coming to the surgeon, the surgeon should go to the patient, operate at the home, and give the patient the greatest chance to conserve his normal resistance to disease. To do this involves great self-sacrifice upon the part of the operator, as well as a vastly increased amount of work. It means having a definite equipment and technic, and the taking along of one skilled assistant, who may be either a physician or a trained nurse—a physician for anesthetist and an extra well-trained nurse to leave with the patient. During the after-care the surgeon must always stand ready to respond to call, for many a fine life-

saving operation has been ruined by lack of attention upon the part of the surgeon to the details of the after-care. With this brief allusion to the preparation, technic and after-care, I will leave that subject, expressing at this time my appreciation of the worth of that able article: "*Operations in imperative surgery in private houses; A demonstration of surgical technic*," read before this Association by our late distinguished fellow, Dr. Willis G. MacDonald, and printed in our transactions of 1903. That article is as good to-day as it was ten years ago, and represents the best that can be said.

Now, let us turn to the type of disease or injury requiring operation at the home, eliminating such urgent surgery as that of railway, mine, army and navy accidents, and apply our thoughts particularly to abdominal, pelvic and obstetric conditions as seen by the members of this Association, and in the foreground stands out prominently the acute perforative conditions of the hollow viscera below the diaphragm. Shall they be transported variable distances for the known advantages of a hospital or be operated upon in the home? Much can be said upon both sides, but in my judgment they are distinctly a type where the home operation has a great field of usefulness. For example, I will cite the following cases:

F. L., aged twenty-nine. Florist. Widower. Usual symptoms of duodenal ulcer for past four years. Taken with typical symptoms of perforation at 3 P. M., May 14, 1914. Diagnosis of perforated doudenal ulcer, by the attending physician, Dr. Jacobus of Millbrook, N. Y. Referred to me for operation, and in a telephone message the attending physician stated the diagnosis and deplored the fact that the patient was so situated that a home operation was not to be considered. There was an automobile ride of eighteen miles to the hospital. The patient's great pain and severe thirst led him to drink a liter of beer at a wayside inn *en route*. Reasonably rough road. Operation at hospital nine hours after perforation. Abdomen and pelvic cavity filled with gastric and intestinal contents —bile, beer, etc. Immediate suture of ulcer, drainage, etc. Rallied well and for several days seemed to be doing nicely. Died from peritonitis and toxemia eleven days later.

Is it not reasonable to presume that the great contamination in this case, with resulting death, was largely due to the spilling out of the intestinal contents, through the perforation, occasioned by the jolting incident to the transportation eighteen miles by automobile? Would not his chances have been better had it been possible for the surgeon to have gone to the patient and a home operation done?

In comparison with the above case is the one of

Mr. B., aged forty, who, while driving at a fast pace over a rough road in the spring of the year, was, by reason of wheels going into

a hole in the road, thrown violently upon the dashboard, striking upon his abdomen. Suffered intense pain and shock. Removed to a nearby house, placed upon a sofa, without being undressed, and allowed to remain in that position without moving, and with legs flexed for thirty hours. His stubborn disposition had much to do with this seeming lack of attention, as he would not permit the neighborly family, in whose house he was, or the attending physician, to change or move him. Seen thirty hours after accident. Diagnosis of probable perforation of bowel. Immediate operation at the house disclosed a large rent in transverse colon, near hepatic flexure, almost severing bowel in two. Very moderate soiling of abdominal cavity, and that limited to the immediate region of the injury. Suture of bowel, proper drainage, uneventful recovery.

In this case the fortunate result was no doubt attributable to the freedom from dissemination of intestinal contents by reason of the absolute quiet of patient following the traumatism, and the home operation which entailed no possibility of increasing contamination by journey to hospital. When we consider how in these severe abdominal calamities nature splints and protects the damaged viscera by tense abdominal muscles, lessened peristalsis, flexed thighs, and increasing pain upon any attempt at movement, we should respect these natural methods of avoiding spread of infective materials and endeavor to imitate them to the greatest possible extent, carrying out our surgical procedures with the least amount of transportation and movement consistent with proper treatment. Patients debilitated by weeks of illness with typhoid fever and its resultant damage to resistance, should have their vital forces conserved when perforation occurs, and operation performed where the patient is, rather than subject them to transportation with its consequent exhaustion and necessary spread of infective materials. Stab and gunshot wounds represent the dangers of shock, hemorrhage, and spreading infection, and in my judgment—although my experience has not been great along such lines of surgery—are best treated where the accident occurs, providing the environment is at all compatible with a reasonable degree of safety and after-care.

The danger to life in certain cases where hemorrhage has to be reckoned with will constitute in many cases an imperative necessity for home operation; for instance, consider the cases of ruptured solid viscera, such as liver, spleen and kidney, and the almost certain increase of hemorrhage entailed by transportation. I have in mind one case of fracture of the kidney, treated by another surgeon, without operation, and doing nicely, when active and fatal hemorrhage intervened as a result of moving him one mile across the city to obtain the advantages of hospital care. Such calamities leave

their imprint upon the mind of any surgeon who has for his aim and attainment in life the saving of the greatest number of people.

Let us consider for a moment cases of ruptured ectopic gestation, and I think you will agree with me that in the more severe type, where death from hemorrhage seems imminent, the operation should be performed where the patient is located, regardless of the surroundings. But in those cases where the bleeding has ceased, as a result of clot formation, and improvement is shown, it is evident that they will represent the debatable group, as to whether home operation or removal to a hospital shall prevail, and I cannot agree with those of our profession who would relegate all such cases to the hospital, but would take the position of Huggins (Transactions of American Association of Obstetricians and Gynecologists, 1909, vol. xxii), who says: "If the surroundings prohibit operation at the home of the patient, she should be removed to a hospital, with the *greatest possible care* in the transportation." And again, in the same article, he says: "This operation *can be safely* performed at the home if the surroundings are not prohibitive."

As suggestive of the peril attached to the moving of such cases, let me report the case of

Mrs. T. B., aged thirty-five, referred by Dr. Nelson Borst. Usual symptoms of ectopic gestation, with rupture which had occurred two weeks prior to my entrance in the case. Patient in good condition, fully recovered from all immediate effects of the hemorrhage, pelvic cavity filled with old blood clot. No sepsis. Home suitable for operative procedure, but not considered. Patient removed by ambulance a distance of seven (7) city blocks. Reestablishment of severe acute hemorrhage. Abdomen opened immediately and the bleeding controlled, but too late to save the patient. This represents a case where life was sacrificed by substituting the hospital for the home as the place for operation.

And how frequently, when operating at the home upon one of these cases, and noting the small margin of safety in the protecting and life-saving clot, do we tremble at the thought of what might have happened had there, through any jolt or jar, been a dislodgement of that protecting plug.

Likewise, in cases of placenta previa where hemorrhage is present, we have a type of case where absolute quiet is obligatory until the proper surgical or obstetrical procedures are established and the patient placed upon a safe basis. Perhaps, a properly applied tamponade may be adequate to render transportation permissible, but I venture to suggest that a strong element of safety is produced

when the procedures incident to delivery are conducted in an aseptic and painstaking manner at home.

When Cesarean section is to be performed we should judge carefully each case and be guided by the condition of the patient and the proximity of the hospital. Elective cases should, without any question, be removed, but many of the emergency type, and especially if far distant from an institution, had better be cared for where they are. In the acute infections of abdominal and pelvic organs we have not only to conserve to our greatest extent the natural resistance of the patient, but we must protect from harm those limiting adhesions which constitute in many cases the only safeguard against a general infection and be very careful how we transport those cases over city street or country road to a hospital, often to find that the localized process which nature had cared for so well while the patient was quiet at home, has been changed to a spreading infection occasioned by damage incident to removal. Likewise with that borderline class of cases, such as unruptured appendices and tubes nonadherent but distended with pus, one can well tremble at the risk incurred when rupture takes place as a result of our unwise efforts at placing them under what we consider to be a better environment. In all such cases, when removal must be practised, it should be done only under the careful guidance of a physician or nurse who is duly impressed with the seriousness of the task, and the measures of care required in the procedure. For, often indeed do we see these patients during transportation placed in the hands of irresponsible people who have no knowledge of what they are doing except that they are to land that sick person within the doors of a hospital. As a result of such treatment we can all recall cases handed over to us, exhausted, in shock or with a spreading infection from rupture and the normal resistance of the patient depleted to such an alarming extent as to place his life in great peril, thus developing upon us a responsibility and an amount of work extending over weeks or months that could have been averted by a simple operative procedure carried out at the home or judicious and careful handling of the patient during the removal. Intestinal obstruction cases and strangulated hernias, unless taken early, represent a type that should have careful judgment exercised as to where operation should be done and environment should be only one consideration and hospital *versus* home should be estimated carefully with reference to each individual case.

A moderately increased hazard is incurred in subjecting some cases of incomplete abortion with hemorrhage to removal from home, and this applies to many cases of sloughing submucous fibroids which are

extruded into the vagina. Fortunately the danger incident to transportation in these cases is so well understood by the general practitioner that they are usually cared for at home or transported with care commensurate with the needs of the case.

Aged people are very loath to leave their homes and frequently when operated do not rally so well in strange and unfamiliar surroundings, deprived of their accustomed associations. Mental aberration, insomnia and increasing feebleness supervene, and the mortality will be increased by insistance upon removal in all cases to the hospital. Many such patients can be operated at home with lessened danger and added comfort. I have in mind several cases where the mental condition cleared only after return of the patient to the familiar environment of the home.

In order to prove the relative merit of hospital *versus* home operation, one must have recourse to statistics as to mortality, and in this particular subject they are difficult to obtain; and one must always consider that cases operated at home represent a severe type made up largely of the emergency type, and many of them suffering from sepsis or toxemia. Naturally, under such conditions, one could not expect to have as good mortality rate as in hospital cases where elective work and uninfected cases are the rule rather than the exception, and yet in my surgical work in the hospital covering a period of twelve years, 1902 to 1914, and with an average of 60 per cent. abdominal work, there was a mortality of 3.4 per cent. The average mortality during the past three years was 2 per cent. No attempt was made to exclude any properly operative case and all patients dying in the hospital regardless of when or what complication, were included. After a careful and exhaustive study of my results obtained when operation was done at the home, covering the same period of twelve years, I find that the mortality is 4.3 per cent. When we consider that the home-operated cases represent the severest type, and that the performing of elective surgery at the home was discouraged, I think the above statistics, covering several thousand hospital and home cases—about 20 per cent. being operated at home —speak for a fair amount of safety for the home operation.

One could go on indefinitely sorting individual cases f om various types of surgical disease that would be best cared for in the home and it is quite impossible to lay down any hard and fast rule to govern us. It should suffice and the purpose of this paper will have been obtained, if I have left with this Association the thought that in these days of magnificent hospital development and attainment, there still remains a modest number of cases where the life and health

of the patient are rendered more secure by operation performed at the home.

DISCUSSION.

Dr. Gordon K. Dickinson, Jersey City.—I am glad to hear a paper on this topic, because last year I was critcised by the president and others for a suggestion in technic I made, that might be of avail in the home operation. I am fully convinced that there are several aspects to this subject. Dr. Sadlier living in an agricultural neighborhood undoubtedly is called frequently to the country to operate and necessity must arise when he will have to attend patients in their homes. Anybody can operate in a home, anybody can operate in a barn, but the trouble comes when complications take place, and they occur altogether too frequently. For instance, a dilated stomach after the operation, or a dilated duodenum or ileum and the other conditions that arise, and you cannot in the night direct treatment as well in a home as you can in a well-organized hospital.

Then again, I perceive in this, not in Dr. Sadlier's case because I know him too well, the cloven foot of commercialism. There is too much in trying to do things in the home and the attending physician pushes himself in and takes charge and assists in the operation too regularly and in the after-care to a certain extent in the absence of the surgeon, thereby enabling him to come in rather deeper on the fee. I want to say just now what I wanted to say a little while ago in connection with Dr. McClellan's paper, that we have two classes of surgeons, one wise with the fingers, and the other wise in brains. We have those who are skillful and wise, but they are the true geniuses of the profession. The man who is wise in his brain is the man who is well able to progress in medicine, while the man who is a mere mechanician does very little or nothing for the profession. All hospitals should not only be considered places where patients should be taken for recovery, but they should be universities for postgraduate work, and with every patient who is operated at home we miss an opportunity to educate the profession. If a town is sufficiently large to have a hospital and there are many cases of peritonitis from appendicitis, there must be a poor surgeon there because he has failed to educate the profession as to the proper time to operate for appendicitis cases. The same holds true with regard to cases of ectopic pregnancy and tubal abortion. Every patient should be considered as not only a true patient but also a subject for education.

A REPORT OF ALL ABDOMINAL CESAREAN OPERATIONS PERFORMED IN THE SERVICE OF THE LYING-IN HOSPITAL, NEW YORK.

BY

ASA B. DAVIS, M. D., F. A. C. S.,

New York.

We wish to bring before the Fellows and place upon the records of this Association a report of all the abdominal Cesarean sections done in one hospital by a limited number of surgeons acquiring their operative material from the same source. This work has extended over a period of a little more than twenty years. To be exact, from December 24, 1893, to September 10, 1914. By far the larger part of these operations has been done in the past ten years.

The Lying-In Hospital is now writing its sixty-second thousand histories of women attended in its Out-patient Department; its twenty-ninth thousand histories of patients attended in the hospital. Deducting some two thousand cases attended before any Cesarean sections were done and also the abortions, gynecological and the general cases, it is fair to state that this hospital has delivered something over eighty thousand women at or near the full term of their pregnancies during the time given above.

A search of its records shows that from this number of cases, five hundred and seventy-one deliveries have been by abdominal Cesarean section. In five hundred and ten instances, the mother has recovered and has been discharged from the hospital in good condition, except five recent cases whose recovery is assured—now convalescing. The maternal recovery is 89.3 per cent. of the cases operated upon. The postpartum day of discharge of these cases is something of an index of how they recover. The later cases show considerable reduction in the number of days of postpartum care. Thus we find by taking the average day of discharge by hundreds, considerable progress has been made. They are as follows:

First hundred	25th day
Second hundred	20th day
Third hundred	19.2 day
Fourth hundred	17.6 day
Fifth hundred	17.5 day
Sixty-six hundred	17.7 day

If we were able to exclude several cases whose recovery was complicated and prolonged—some of them remaining over seventy days —the average day of discharge would be much reduced. It is very near the fourteenth day in the majority of cases.

DEATHS OF MOTHERS.

Sixty-one women have died following this operation, a maternal mortality of 10.7 per cent. from all causes. We may say that a very large proportion of these deaths occurred in spite of rather than because of Cesarean section. Thus, there is a group of thirteen cases of toxemia of pregnancy and eclampsia who died after this operation. Their condition was such that they would have died under any plan of treatment.

There are two classes of so-called border-line cases. First: the clean, uncomplicated cases in whom there is a contracted pelvis or other moderate obstruction in the birth canal or a marked disproportion between the capacity of the pelvis and the child which is to be delivered. In these cases it becomes a matter of very good judgment whether a trial labor shall be allowed or some form of vaginal delivery be attempted, or whether they shall be delivered by Cesarean section. We see a considerable number of women who have contracted pelves in whom we must decide that delivery shall be by Cesarean section if we rely upon pelvic measurements alone. Yet a large proportion of such women have small children capable of being easily molded and are delivered spontaneously or by low forceps operation. In another class of cases of rather limited number, we find the pelvis of normal size and, in some instances, above the normal size, and yet the fetus is so large, the bones of the fetal head are so thick and unmoldable, there is such a disproportion between the capacity of the pelvis and the fetus that abdominal Cesarean section is the only safe way of delivery. Pelvic measurements alone can be relied upon only as a guide rather than final in judging these cases.

There is another class of border-line cases. This class gives us a very high morbidity and mortality in mother and child. We refer to these women, on our own service, who have been long in labor, sometimes with membranes ruptured, or in whom the trial labor has been allowed for an unwarranted time. Many vaginal examinations have been made, or it may be some form of vaginal delivery has been attempted; labor has been persisted in until the mother is exhausted, the fetus compressed and in poor condition. These are

apt to be the cases in whom the disproportion between the fetus and pelvis is small, the vertex partially engaged, or the obstruction may be in the lower part of the pelvis. Such cases are rarely badly infected, but they are poor Cesarean risks. Or the cases may come under our care as emergencies after having been long in labor with membranes ruptured, or in the care of midwives, and usually later in the care of private physicians who attempt forceps delivery. Such patients may be admitted in apparently very good general condition, yet already infected, or they may be in poor general condition, very much exhausted and also infected. We are bound to care for such cases as we find them. How shall we manage them? Whatever course we pursue we know that the mortality and morbidity for mother and child must be very high. Some will say that we should do a craniotomy, destroy the child and thus save the mother. It may be said with truth that many of these unborn children are already dead or nearly so; or they may be in good general condition, but already so infected with the same germ which jeopardizes the life of the mother, that, though born in good condition, they soon die from sepsis. If these contentions covered the whole situation, craniotomy would be the only justifiable mode of delivery in these cases. But craniotomy is neither a safe nor an easy operation. In fifteen hundred consecutive cases, one-half from the Out-door Department and one-half from the In-door Department, craniotomy was found necessary one hundred and twenty-two times. Nineteen mothers died, a maternal mortality of 15.5 per cent. Symphysiotomy is no longer an operation to be considered; pubiotomy is less often employed than formerly. The so-called extraperitoneal Cesarean section is on trial. The scope of this paper does not permit us to go far into details concerning the outcome of these cases delivered by Cesarean section, but a considerable number of them, though they experience a stormy and protracted puerperium, recover.

This second class of border-line cases is capable of being very materially reduced. In many of these women the indications for Cesarean section are present and positive from the beginning of labor or before. This should be appreciated, and they should be operated upon while mother and child are yet in good condition. It should be more generally recognized that delay is dangerous, that delivery by high forceps or difficult version—even in hospital surroundings and in the hands of the skilful and experienced obstetricians—is among the most dangerous operations known to surgery. Even under these conditions the results are too often deplorable.

Many of us know to our sorrow what the results are in the hands of the unskilled in unfavorable surroundings. The children are apt to be born dead or they are severely injured. The mothers who survive (there are many who do not) are made invalids for the remainder of their days in too many instances. Yet prior to the birth of the child they had the right to look forward to a strong and healthful existence. A homicide occurs in a community, possibly two vicious lives are involved. One of these lives is already disposed of. The police, the legal machinery, the press and public opinion are at once set in motion to save or destroy the other life. Time, public treasure and legal skill are employed without stint. A knowledge of the crime is spread to the limits of our country. Yet the loss of life, the destruction of homes, permanent disability and the sacrifice of the innocent at the time of childbirth is greater, we believe, than that due to homicide. It goes on silently and is accepted without much complaint, because it always has been as it now is. In the presence of appendicitis the medical and lay public is educated to such a degree that the practitioner who allows this condition to drift on unduly, and if he be not a surgeon, does not seek surgical council, and prompt operation where necessary, surely and justly lays himself liable to unfavorable criticism.

We ask that some such condition shall obtain regarding difficult obstetric cases. To some extent death and injury must ever be associated with childbirth. It is our duty to reduce this death rate and injury to the minimum. This calls for better obstetric teaching, a greater willingness to break away from old methods which have been found wanting, a willingness upon the part of those of us who have not been adequately trained to recognize our limitations. And to remember that time, and vaginal interference or the absence of such interference are very important factors in determining what the outcome of a difficult labor shall be. Abdominal Cesarean section is in no sense a cure-all in obstetrics. It is a very valuable agent, and its timely employment will do much to reduce the mortality and morbidity of which we complain as now occurring in obstetric practice.

We report a total maternal mortality of 10.7 per cent. following Cesarean section occurring in five hundred and seventy-one operations. This high death rate is made up largely from neglected and mismanaged labors. It is a comparatively simple operation in the hands of those accustomed to abdominal surgery. It is susceptible of proof from our histories that in clean uncomplicated cases delivered by Cesarean section shortly before or soon after labor begins, the

maternal mortality is between 2 and 3 per cent. and there is no fetal mortality in such cases.

In five hundred and seventy-one Cesarean deliveries, five hundred and seventy-seven children were born. Twins seven times. In one case the first twin was born before admission. The second twin had a depressed fracture of the skull from high forceps traction of the vertex against a sharp promontory. The mother was sent to the hospital as a case of rupture of the uterus, which did not exist, and the second child was delivered by Cesarean section.

We count all cases as deaths if they do not live to be discharged alive from the hospital, regardless of the duration of their stay. Of the five hundred and seventy-seven children delivered by Cesarean section, sixty-nine were either stillborn or died before leaving the hospital, a fetal mortality of 12 per cent. Twenty-three or 4 per cent. were stillborn.

From the sixty-one mothers who died following Cesarean section, sixty-two children were delivered. Forty-four children lived. Eleven died, and seven were stillborn.

Eclampsia and toxemia of pregnancy were the indications for Cesarean section in thirty-five cases; twenty-two or 63 per cent. of the mothers recovered. Thirteen, or 37 per cent. of these mothers died. From these thirty-five cases, thirty-seven children were born, twenty-six, or 70 per cent. of these children lived. Eleven children, or 30 per cent., were either stillborn or died. Four were stillborn. Seven died. Period of gestation in these thirty-five cases: Fourteen at the tenth month, three at the nine and one-half month, twelve at the ninth month, two at the eight and one-half month, one at the eighth month, one at the seven and one-half month, two at the seventh month.

Placenta previa was the main indication in twenty-one cases; two of these mothers died from sepsis; twenty-one children were born, fourteen children lived, four children died, and three children were stillborn. The fetal mortality was due to prematurity.

Accidental Hemorrhage.—We find three cases of accidental hemorrhage, the mothers and one child lived. One child was still born; one child was premature and died in a few hours.

Repeated Cesarean Section.—Seventy-eight cases have been delivered more than once by Cesarean section; sixty the second time, fifteen the third time, one the fourth time, one the fifth time, one the sixth time.

Rupture of the uterus in labor subsequent to Cesarean section. This accident occurred in six cases. Three mothers died. Three

mothers recovered. Two children lived. In these two cases the children were in the uterus and alive and were delivered by Cesarean section. Four children were free in the abdominal cavity and dead.

Various Presentations.—Vertex in 512 cases, brow in two cases; face in two cases, impacted; transverse in two cases, prolapsed cord in two cases; not noted, twenty-four cases.

Main indication for Cesarean section was some form of contracted pelvis or deformity of the spinal column in 441 or 79 per cent. of the cases. While malacosteon is reported by Playfair as being a common indication in England for this operation we have seen but one case in the Lying-In Hospital. There are nine cases of some neoplasm occluding the pelvis as the main indication for Cesarean section; and nine cases following some form of suspension of the uterus required a Cesarean operation. In eighteen cases an unduly large child was the indication.

The number of the pregnancies were: one para in 214 cases; two para in 128 cases; three para in ninety-one cases; four para in forty-five cases; five para in thirty-seven cases; six para in thirteen cases; seven para in fourteen cases; eight para in thirteen cases; nine para in four cases; ten para in three cases; twelve para in two cases; thirteen para in one case; fourteen para in one case; not noted, twelve cases.

There have been seven cases of postmortem Cesarean section not included in the foregoing records. Two children were delivered alive. One lived six days. The others lived.

The writer's personal experience with abdominal Cesarean section is limited to 237 operations, 193 of which were reported at the last annual meeting of this association. Forty-four Cesarean sections represent our work in this line from the last report up to the present time. Of 237 cases, twenty-four mothers died. Maternal mortality, from all causes following this operation, 10.12 per cent. In our first one hundred Cesarean operations, there were fifteen maternal deaths; in our second one hundred cases, there were five maternal deaths, and in our last thirty-seven cases, there were four maternal deaths.

Two hundred and forty children were delivered (twins in three cases); thirty-three children were either stillborn or died before leaving the hospital; infant mortality 13.8 per cent.; eleven, or one-third of the infants were stillborn. Dead child before operation, prematurity, long labor, attempts at vaginal delivery, prolapse of cord before operation, and toxemia of the mother are among the more prominent causes of the infant mortality.

REPEATED CESAREAN SECTION.

In the 237 Cesarean sections, the operation was performed more than once on the same patient in forty-one instances; in twenty-nine cases, two times; in nine cases, three times; in one case, four times; in one case, five times; and in one case, six times.

Of these forty-one cases, three mothers died. The first died of sepsis on the fourth day after her second Cesarean. Her first delivery was by this operation in another hospital. In her second delivery, she had been long in labor and high forceps had been attempted before admission to this hospital. The child lived.

The second died of shock and hemorrhage on the third day after her third Cesarean in this hospital. The child lived.

The third had her second Cesarean on January 30, 1909. Good recovery, except fever for one day. Culture from uterus showed colon bacilli. Discharged in apparently good condition, February 14, 1909. Readmitted March 1, 1909, with mural abscess connected with necrotic uterus. Hysterectomy. Died from sepsis ten days later. The child lived.

Rupture of the uterus during labor subsequent to Cesarean section has occurred in three of our cases. All in the first labor subsequent to the first Cesarean section. Two mothers and their children survived; one mother and her child died. Each of these accidents might have been avoided had the mothers followed our repeated instructions and come to the hospital at the first onset of labor, instead of waiting in their homes for many hours in active labor before seeking surgical aid.

A report of forty-four Cesarean operations, which represent our experience, during the past year is here offered in detail: Thirty-nine of the mothers were discharged from the hospital in good condition; twenty-one were discharged between the twelfth and the thirteenth day postpartum. Of these, one was discharged on the tenth, and five on the eleventh day at their own request; nine were discharged between the fifteenth and the sixteenth day; six were discharged between the twenty-fifth and the twenty-sixth day; two were discharged on the twenty-ninth and one on the forty-first day. This last patient was detained at the hospital on account of an operation for hemorrhoids. In this series of forty-four Cesarean operations, five mothers died. Maternal mortality, 11.3 per cent.

MATERNAL DEATHS.

Case I.—(C.N. 26015.) Bronchopneumonia. Mrs. B. F. Aged thirty-five; para-vii. Obstetric history began in 1906. One

abortion at three months. Five full-term children; all very large; all instrumental deliveries. Two stillbirths; three lived five days each. All had birth paralysis. Patient is very large and stout. Funnel pelvis. Thick bones. Internal diagonal conjugate 12.5 cm. At full term; not in very active labor for eight hours. Very large child (weighed 4930 grams) Vertex could not be made to engage at inlet. Operation uncomplicated. Vomiting a great deal of partially digested food soon after operation. Stomach lavage. Inspiration pneumonia developed on second day. Wound healed by primary union. Uterus involuted well. Patient died on the tenth day. Child lived.

Case II.—(C.N. 27127.) Antepartum hemorrhage. Partial placenta previa. General peritonitis. Staphylococcus aureus. Mrs. E. B. Aged twenty-two; para-i; at term. In labor, and in charge of private physician who packed vagina with iodoform gauze. Margin of placenta covered about two-thirds of cervical opening. Os dilated enough to admit three fingers. Generally contracted pelvis alone a positive indication for Cesarean section without the presence of placenta previa and hemorrhage. Immediate Cesarean section. Uncomplicated operation. Convalescence unsatisfactory from the start. She died on the eighth day of general peritonitis. Only partial union in the uterine and abdominal wounds. Child lived.

Case III.—(C.N. 27260.) Mrs. R. H. Aged, twenty-eight; para-i. Male type pelvis, large child. Active labor fourteen hours. Chloroform to surgical degree repeatedly given and repeated attempts at high forceps over a period of five hours by private physicians. Vertex partly engaged. Death in six hours after Cesarean operation from shock and chloroform poisoning. The child lived.

Case IV.—(C.N. 27470.) Aged twenty-seven; para-ii. Contracted pelvis. First child said to have been delivered at eight months by instruments; stillbirth. Present delivery at full term by Cesarean. Clean case. Herniotomy at this time in midline above umbilicus by overlapping fascia with mattress sutures. Considerable tension. Wound infection. Poor union followed by general peritonitis. Death of mother, seventeenth day. Child lived.

Case V.—(C.N. 28310.) Toxemia of pregnancy, well-marked nephritis. Aged thirty-two; para-i. In good health until about two weeks prior to admission. Then one of the first symptoms was pronounced epigastric pain. Upon admission, there was very little edema. Moderately diminished quantity of urine; marked trace of albumin; many hyaline and granular casts. Blood pressure 142. In daily examinations for six days, it reached 150 but once. Milk diet, rest in bed, saline irrigations, hot packs, etc., for six days. No perceptible improvement. Suddenly pulse rose to 140 and patient became very ill. Responded to stimulations. Cesarean section within twelve hours. Liver came into view at operation. It was yellow and mottled, the characteristic appearance found post mortem in liver of eclamptic mothers. Bad prognosis given at this time. Convulsions, which had been absent prior to operation, developed soon after delivery and recurred until death which took place within twenty-four hours after labor. The child died on the ninth day.

INFANT DEATHS.

Forty-four children were delivered. Forty-two were discharged from the hospital alive and well. Two infants failed to live. Infant mortality 4.5 per cent. Of these, one was the child prematurely delivered from the eclamptic mother just reported. It undoubtedly shared the intoxication. One infant was stillborn and macerated. In this case, the mother had a male-type contracted pelvis, with a history of three instrumental deliveries, resulting each time in either a stillbirth or a child which lived but a few hours. Wassermann reaction repeatedly negative. She was almost insanely anxious for a living child, and she reported at regular intervals during the present pregnancy for observation. About ten days before labor, she appeared in great mental distress, stating that fetal movements had ceased the night before. She was very stout. After careful examination, no fetal heart could be heard or fetal movements felt. An examination, eight days later, gave the same result. Patient stated she had felt slight fetal movements in the interval. Two days after the last examination she was admitted in active labor. Vertex presentation; head not engaged. Several examiners were convinced that they could hear the fetal heart. The maternal pulse was very rapid. In this case, the writer expressed himself as not being convinced that the child was living. In view of the previous history of large dead children after instrumental delivery, the divided opinion as to the presence of the fetal heart sounds and the mother's desire for a living child, Cesarean section was done immediately. A large macerated fetus was delivered. The skin was smooth, but its gross appearance was such that it would have been classed as a syphilitic fetus a few years ago. The mother made an uneventful recovery and was discharged on the eleventh day.

INDICATIONS FOR CESAREAN SECTION IN THIS SERIES OF CASES.

In forty cases, well-marked contraction of the pelvis furnished the indication for this operation. In one case, antepartum hemorrhage and partial placenta previa at term and in labor were the more urgent indications. There was also in this case a generally contracted pelvis which, in itself, was a positive indication. In another case, a primipara in labor and unobliterated cervix, eclampsia with repeated convulsions was the indication for Cesarean section. Mother and child lived. Both were discharged, in good condition, on the twelfth day. Premature separation of placenta, antepartum hemorrhage and undilated os were the indications in a third case. This patien

ran a septic course after delivery. She and her child were discharged well on the twenty-ninth day. In the fourth case, the indications for Cesearean delivery were the same as in the second case but mother and child died

Ankylosis of the right hip with distorted and contracted pelvis and adduction of the lower extremity was observed three times in this list of cases.

REPEATED CESAREAN SECTION.

Six of these patients were delivered a second time by Cesarean section; two a third time. All mothers and children lived.

The technic of the high operation for abdominal Cesarean section is illustrated with five original drawings. The description of the operation, already published several times, is herein repeated. The first drawing shows the location and relative length of the incision in the abdominal wall. Its lower end is purposely kept about 2 cm. above the umbilicus to avoid weakening the umbilical ring. A considerable number of child-bearing women have a small umbilical hernia without causing any inconvenience. In some cases, in which the abdominal incision extends down to or partially through the umbilical ring, we have seen a small hernia develop months after delivery, and entirely below the scar. The second drawing shows the uterus, after the delivery of the child, held up to the abdominal opening by the long ends of a deep suture at each angle of the uterine wound. The third drawing shows the first layer of uterine sutures in place but not tied. The fourth drawing shows the uterine wound closed by the first layer of sutures and the sutures tied and cut close to the knots. The fifth drawing shows the second and final layer of uterine sutures partly in place. We use here plain No. 1 catgut and practically the Cushing stitch. The needle is passed just outside of the tissue included in the deep layer of sutures and parallel with the line of the uterine wound, taking up peritoneum and going well into the uterine muscle, folding this tissue over from one side and then the opposite, forming a welt which entirely covers the deep sutures and the uterine wound.

The operation is performed as follows: The abdomen is opened by a median incision, 8 to 10 cm. long, from above down to the umbilicus. One or two gauze pads, wet with warm normal salt solution, are placed in the abdomen above the fundus of the uterus to hold back omentum and intestines. Often the uterus is found twisted upon its long axis, usually toward the right side. An assistant, standing beside the patient opposite the operator, makes pres-

sure with his hands against the outside walls of the abdomen, rotating the uterus so that its anterior wall looks directly forward. He must regulate his pressure so that the uterus is held well up to the abdominal opening and hold it there until it is emptied of its contents, and until several of the deep sutures have been placed and tied.

FIG. 1.—The incision.

This, however, is in no sense a maneuver to control hemorrhage. The uterus is carefully incised so as to keep the membranes (the "bag of waters") intact. The incision may be a little longer than the abdominal opening. It is made from just below the fundus downward. If the placenta is found beneath this wound, a not infrequent occurrence, it should be pushed aside or torn through and, with the

hand in the uterus, the membranes should be separated from the uterine wall while they are yet distended. Neglect of this precaution often means that they must later be removed piecemeal, sometimes with much difficulty and delay, after the child is delivered and

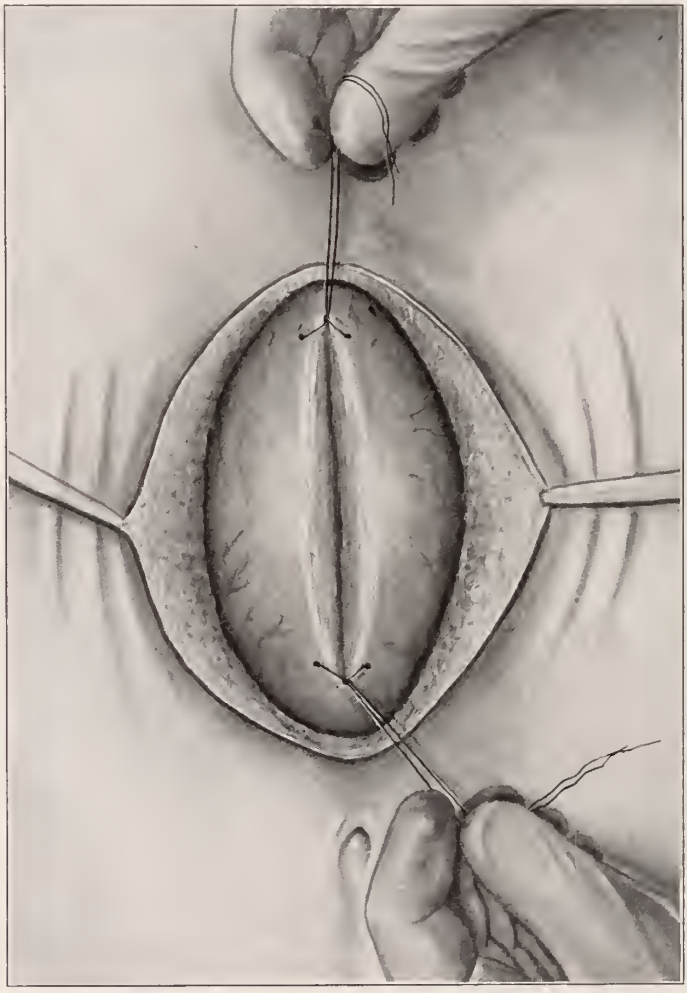

FIG. 2.—The first suture in place.

retraction and contraction have begun. This is the time when dangerous uterine hemorrhage is most likely to occur.

The anterior thigh of the child, or the one which is most readily found, is grasped and extracted. A breech extraction is done. After

the shoulders have been delivered the child is turned so that its face looks toward the mother's face. Then with the middle and index-fingers of the right hand astride its neck, and with the same fingers of the left hand in its mouth making traction on the lower jaw, the head is carefully delivered so there may be no sudden jolting or lacerating of the uterus. An assistant stands ready with two

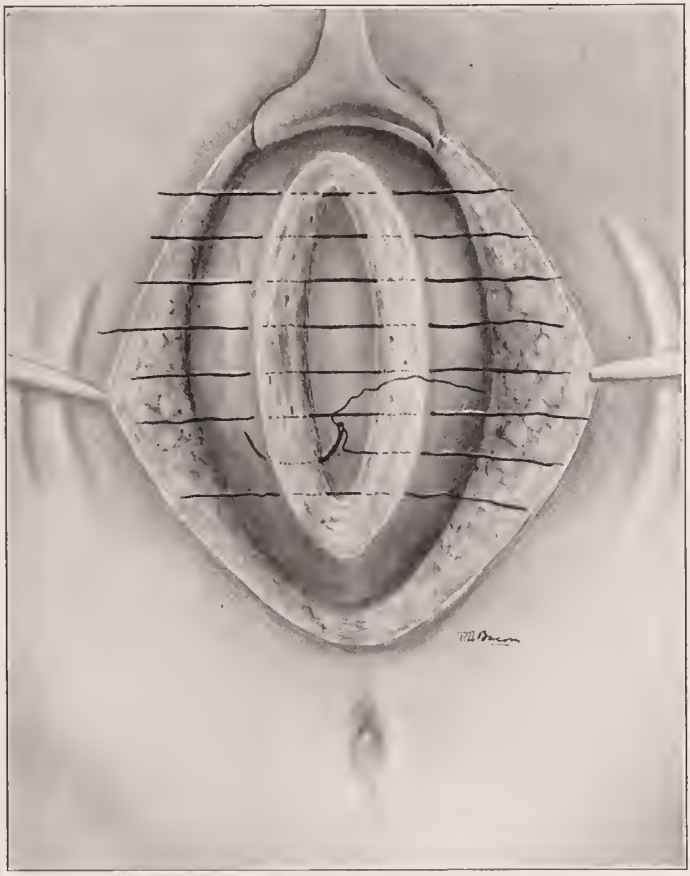

FIG. 3.—Shows sutures in place but not tied.

long forceps with which he clamps the umbilical cord. The cord is cut between the clamps and the child is taken away to have respirations established, preferably in an adjoining room, so that the operating staff's attention may be given entirely to the mother. We now hook two fingers of the left hand into the uterus at the upper angle of the uterine wound, and place and tie the upper deep suture, leaving

the ends long. This is repeated at the lower angle of the wound and then with the right hand in the uterus, the placenta, membranes and coagula are removed. The first assistant now discontinues abdominal pressure and holds the uterus up to, but not out of, the abdominal opening by the long ends of the sutures already in place. The uterine wound is closed by two layers of sutures. The deep layer consists

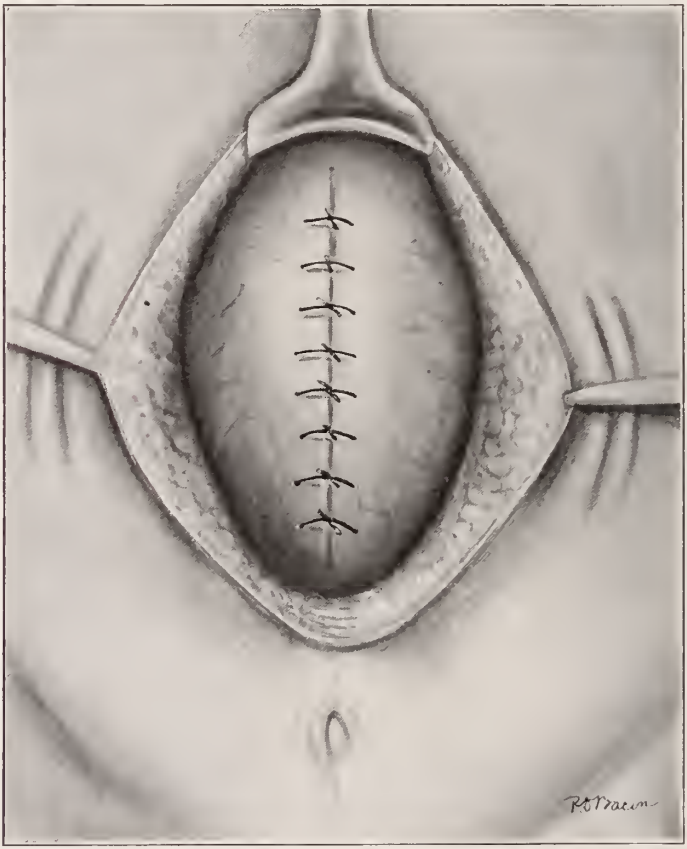

Fig. 4.—Deep sutures tied.

of No. 2 chromic gut, interrupted, and about 1 cm. apart. They are passed through the uterine peritoneum, close to its cut edge, well out into the muscle and down to, but not through, the endometrium and out in reverse order on the opposite side. A double turn is taken in the first knot, which will maintain its position without the necessity of its being held by a pair of forceps in the hands of an

assistant, and at the risk of cutting or weakening an important suture with the forceps. The suture is drawn tight enough to bring the edges of the uterine wall into accurate apposition, yet avoiding tension which would blanch and constrict the tissues. The sutures are tied in three knots and cut short to the knot. The entrance and exit

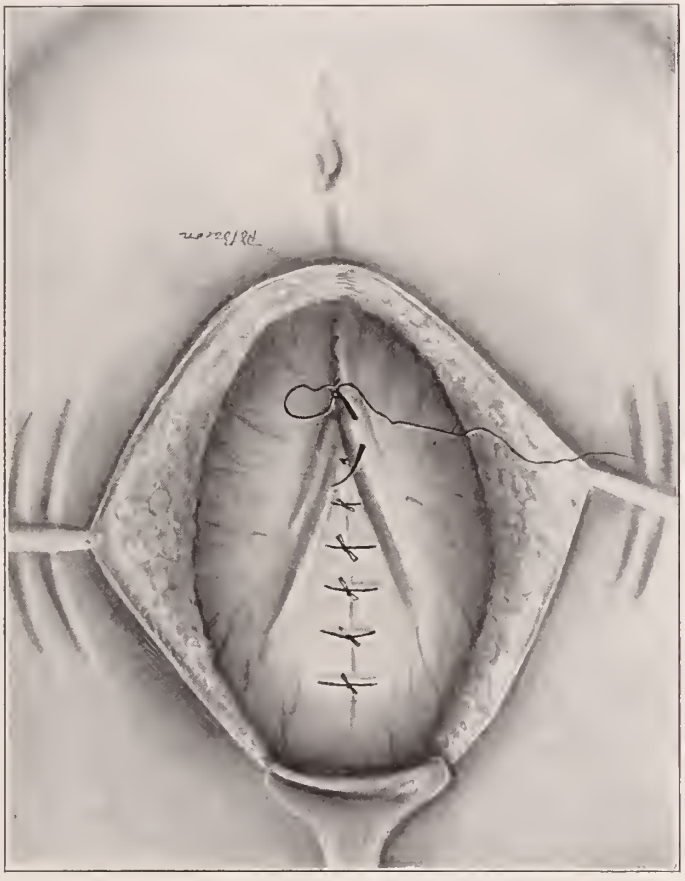

Fig. 5.—Introduction of peritoneal covering suture.

of the deep sutures are close to the cut edge of the uterine peritoneum, and the short ends of these sutures render it more easy to completely bury them by the next layer which is a continuous suture of No. 1 plain gut. Beginning at the lower angle of the uterine wound, this suture is inserted and tied and the knot is covered by folding the peritoneum over it with subsequent stitches. Passing the needle well

outside of the tissue included in the deep layer of sutures and parallel to the line of the uterine incision, the peritoneum and some uterine muscle are caught up, alternately on one side and then the other, folding them over and completely burying the deep layer, much after the manner of the Cushing stitch in closing intestinal wounds. This leaves no raw surface, or sutures, or knot-ends, exposed. This reduces to a minimum the chances of subsequent adhesions of adjacent structures to the uterine wound. The deep interrupted suture holds the two faces of the uterine wound in apposition through the whole depth of the wound. If an interrupted suture gives way, it affects only the tissue held by that one suture. If a continuous suture gives way at one point, its force is weakened throughout its entire length. Every precaution should be taken to avoid adhesions and to secure strong, firm union of the uterine wound, so that the uterus may involute normally and take its position in the pelvis with its mobility unrestricted by adhesions and in the event of subsequent pregnancy the uterine scar will not rupture.

The pads are removed and the abdominal wound is closed in three layers. Dry sterile gauze pads are held in place by a snug adhesive strap across the abdominal wound which is an added support to the abdominal sutures. Elsewhere the dressings and binders are loose, so that the uterus, which is new in the lower part of the abdomen in the position occupied by a uterus after normal labor, may have free movement. The compression of the abdominal wall against the uterine wall is thus avoided and likewise the risk of adhesions between the two as was the case where the tight abdominal binder was employed. The uterus is not delivered from the abdomen at any time. The patient is placed in bed with the head of the bed elevated to favor drainage and descent of the uterus. In the uncomplicated case she suffers the pain and discomfort common to laparotomies for other causes but no more. Morphine in 1/8-grain doses is given by hypodermic injection as needed, and the abdominal distention is relieved by a retained rectal tube or by a saline irrigation. Usually the mother nurses her child and at the end of forty-eight hours she is treated as a normal delivery. On the eighth day postpartum, she sits up in a chair and by the twelfth day she is ready to leave the hospital. Several of our patients have insisted upon going home on the tenth day, while others who were ready to go home on the twelfth day, for one cause or another, found it inconvenient to leave at that time, or else they lived at a distance and they were advised not to attempt to travel so soon. In the uninfected cases, the blood and liquor amnii which finds its way into the

peritoneal cavity does no harm and no great effort is made to remove it.

We find the following advantages in the use of the small median incision entirely above the umbilicus: There is no danger of adhesions between the uterine and the abdominal wounds, and the uterus is therefore allowed to involute normally and take up its position in the pelvis without restricted mobility.

In the midline the abdominal wall is very thin; no important structures are divided and the tissues are quite elastic, so that a small opening is all that is necessary for the delivery of the child. The small abdominal opening offers much less chance for the escape of intestine and omentum and less opportunity and necessity to handle the abdominal contents. Located above the umbilicus there is much less probability of the subsequent occurrence of hernia through the cicatrix, for it is above the most dependent part of the abdomen which is subjected to the greatest strain when the patient is in the upright position. More support is also given at this point by the recti muscles as they tend to come together toward their upper attachments.

While we have not had an opportunity to examine all of the patients upon whom we have performed this method of Cesarean section, yet there is a considerable number who return for subsequent delivery in this way, or for other causes, and thus far we have not seen a hernia in any of our patients, except in one woman in whom the entire thickness of the abdominal wound broke down, and was closed by granulation. This patient developed a hernia several months later through the site of her Cesarean wound in the abdomen.

DISCUSSION.

Dr. James F. Baldwin, Columbus, Ohio.—Mr. President: I think I may say at the outset that we all read with great interest anything that Dr. Davis writes, and I am sure we will be pleased to have the opportunity of reading this paper in full when it is published later in our transactions. I have watched his technic in Cesarean section operations with great interest, and have read all of his reports. Since he brought out the high incision I have resorted to it with very great satisfaction, and have used it except in one or two special cases.

It is always a question in one's mind where we should stop in deciding whether to operate or not to operate. Some of the German operators, who seem to be more anxious about statistics than about human life, refuse operations in which examinations have been previously made, or in which forceps have been used. It has never

seemed to me that that was right. I have operated repeatedly on cases in which forceps delivery had been undertaken, and I have repeatedly operated on cases in which there was already present marked evidences of infection. I reported one such case two or three years ago in which the patient had a temperature of 104°, pulse 130. Nevertheless, Cesarean section followed by hysterectomy resulted in prompt cure, and a living and healthy baby. I do not think it is wise under such circumstances to leave an infected uterus *in situ*.

I have always felt I should give the patient the benefit of the operation, provided her general condition was such as to permit the operation to be made with reasonable safety, and provided the condition of the child was such as to indicate that it had a reasonable chance to survive, but in all septic cases hysterectomy should follow the section. Whether the cervix should be closed in the usual way, covered by peritoneum and dropped, or should be brought out at the lower angle of the incision by the Porro method, is optional with the operator. Under these circumstances I always am careful to protect the peritoneum with extra care, and as soon as the fetus is delivered to flush the interior of the uterus, including the cervical canal and vagina, with tincture of iodine. If there is undoubted sepsis present, then a hysterectomy is made, but otherwise the incision is closed in the usual manner.

In his full paper I suppose Dr. Davis mentions other cases than the classical ones for the operation of Cesarean section. Only a few days ago I reported in the Cincinnati *Lancet-Clinic* a case of Cesarean section in which the indication was a breech presentation, with a large child, in an elderly primipara, with remarkable rigidity of the soft parts. I explained to the attending physician, the women having been in labor for many hours, that to allow her to deliver herself, or to deliver her by the vaginal route, would certainly mean a dead child, with more or less maternal laceration. I felt that Cesarean section was indicated absolutely in the interest of the child, and would probably be less dangerous to the mother under the circumstances than vaginal delivery. I operated, and both mother and child did beautifully.

In another case, the patient going home in fine shape with her baby last Saturday, a one-horned uterus was the indication for operation. Fortunately I had made the diagnosis of this condition years before when I operated on the patient for an acute appendicitis. I found then that she had a uterus with only one horn, the left. I warned the parents and the attending physician that if she became pregnant there would be danger of rupture. In due time she married, became pregnant, and was brought to the hospital two days before her delivery. Her labor was entirely inefficient. She was in the hands of a skilful obstetrician who permitted her to remain in labor for twelve hours, and then reported to me that he thought Cesarean section would be necessary as the child was already giving evidences of distress, and no progress was being made. The soft parts were in good condition, but the pains had not been

sufficient to cause the head to engage. I then made the usual operation. I did it all the more willingly because of a case which I reported in the *Medical Record* a year or two ago, in which I made a hysterectomy for most atrocious dysmenorrhea and found a one-horned uterus, the other horn being represented by a mass about the size of a walnut, containing a cavity about the size of a grape into which menstruation took place, but the blood having no outlet gave rise by pressure to intense pain, which would last about a week. In this particular case I had known that this patient also had a lump on the right side of the developing horn, and as she had suffered similar menstrual pains I suspected that we had here a similar condition. After completing the Cesarean section, therefore, the walls of the uterus being scarcely thicker than paper, I resected this tumor on the right side, attaching the round ligament to the other horn so as to hold everything up in good position. In examining the tissue removed a cavity was found precisely like that in the case previously reported. In this case I purposely made a low incision so as to reach the entire uterus readily.

Dr. Abraham J. Rongy, New York City.—In order to bring Cesarean section before the profession and have it accepted both by the profession and public we must avoid operating on unclean cases. A mortality percentage of even ten is too high for clean cases. I believe in cases that have been handled on the outside, in which forceps have been attempted in relatively contracted pelves, we still have another operation in pubiotomy cases in which infection is presupposed should not be subjected to Cesarean section but should be delivered by pubiotomy. I have performed nine pubiotomies and have not lost a single mother, but lost two children. If we can point out to the medical profession and to the public a mortality of 2 per cent. for Cesarean section, the operation will be more readily accepted.

With reference to the transperitoneal and extraperitoneal Cesarean section, I have attempted to do the operation described by Dr. Hirst. I found it to be complicated by a good deal of hemorrhage and handling of the tissues and it is not the operation of choice. Cesarean section should be adopted as a routine in primiparæ suffering from central placenta previa. I think the chances for a living child and mother are better by delivery through Cesarean section.

In primiparæ with eclampsia, having a rigid cervix, with no signs of labor, Cesarean section is often indicated.

I am using the high incision in Cesarean section. The uterus is easily brought into full view and the chances for postoperative hernia are minimized. I close the uterus by the two-layer method, using a continuous suture for the muscle and submucosa and a continuous suture for the peritoneal layer.

Dr. Gordon K. Dickinson, Jersey City.—I am not an obstetrician, and I have not brought a baby into the world for a great many years. I have been sitting on the fence watching other fellows do the work. The average "male" midwife which is the usual title given to the obstetrician in towns by the people who

employ him, has been reading something about eclampsia and Cesarean section and he speaks of high tension preceding the eclampsia, and I am surprised at the immense number of Cesarean sections that are being done by this class of midwives in sanatoriums, homes, and so on. It seems to me, the men in our association who are doing obstetrics ought to take some stand and make a note of this.

Dr. Davis did not finish his paper. He may have had something to say on Cesarean section for eclampsia and its limitations. Our society should take this matter up and select some man or men to write essays on the subject for next year. There is all together too much Cesarean section work and home work being done for these ailments.

Dr. Channing W. Barrett, Chicago.—I have but very few words to add to the paper that Dr. Davis has presented. I think, at the present time, we should exclude Cesarean section in most septic cases. Some claim that the good results of abdominal work in sepsis of the abdomen can be duplicated in delivery through the abdomen, but I have found that the mortality increases very materially with any manipulation that has been carried out from below, especially outside of a hospital. We cannot give a very good outlook for a patient of that kind, even in the most skilled hands. We still have an operative method to fall back on which is not ideal in any sense, but the operation of pubiotomy gives a very high percentage of recovery both for the mother and child unless fatal damage has already been done. I have seen Dr. Davis do this high operation and I must commend it.

Dr. William Mortimer Brown, Rochester, New York.—I cannot let the opportunity go by without adding one note of emphasis to what seems to be the keynote of Dr. Davis' paper, which is a demand for the more careful preliminary examination of cases and better training on the part of the ordinary practitioner in the examination of these patients. We cannot expect to do all the obstetrics. The general practitioner has to do it, but we must demand of him that he take time and prepare himself to sufficiently investigate these cases, so that he can, at least, make a guess as to what he is going up against, and if then he should be required in some way to avail himself of some other help he can let us see them early instead of bringing these cases to us infected and maltreated, and then expect us to get good results. I had thought I was rather unfortunate in my Cesarean operations but since hearing Dr. Davis' paper, I am glad to say, in the small number of cases that I have had the opportunity of taking care of, some thirty-three or thirty-four in number, I believe the mortality has been a little less than 7 per cent. and that includes all cases, some infected and others malignant where I have had to do hysterectomy and so on. But I do not see why the mortality should not be less than that if we can get the cases earlier and treat them under ideal conditions.

Dr. George H. Lee, Galveston, Texas (by invitation).—I

want to take this opportunity to express the pleasure and instruction I have gotten from my attendance at this meeting.

The question of Cesarean section is an exceedingly interesting one. I come from the other extreme of the United States and I expect that my position in this matter will be rather unique. I have done Cesarean section a few times, with a maternal recovery of 100 per cent., and a fetal mortality of 50 per cent. But let me explain. I have had two cases of Cesarean section, one for threatened eclampsia in a woman who was carried along for a month or more, and in whose case I felt justified in operating. The mother and child recovered. The other case was a full breech presentation, the cord presenting; the woman was a primipara and the wife of a doctor. The fetal pulse was 130 and she was in the first stage of labor. I advised and offered to do Cesarean section which was accepted after some hesitation and a good deal of consultation. I did a Cesarean section and delivered a child that had a spina bifida, and hydrocephalus 50 per cent. which I did not know. How could I have diagnosed it previous to the operation? The mother recovered.

There are a great many points that occur to me in connection with this matter. One came to me while one of the gentlemen was speaking, of doing a Cesarean section for central implantation of the placenta in placenta previa. One of the dangers in the delivery of cases of placenta previa is hemorrhage after the third stage by reason of the fact that the placenta is implanted in the lower passive zone of the uterus is in a portion of the uterus which does not contract and thus check hemorrhage from placental site. The question with me has always been how are we to guard against a hemorrhage after the child and the placenta have been delivered in these cases in which you do Cesarean section for central implantation of the placenta. I would like to have some expression of opinion or some suggestion along that line.

Dr. John Norval Bell, Detroit.—I think Dr. Brown has made a very pertinent remark in this discussion, and that is, we must educate the general practitioner. We all know the advantages and disadvantages of Cesarean section and what the indications are for that operation. We are specialists, but we know the general practitioner sees these cases first and there is a woeful negligence on the part of the general practitioner.

As far as the mortality of the child is concerned, they do not consider that the child has a right to be born alive and can be born alive with our modern knowledge of this subject. What we should do each and all of us is to read papers on this subject in our local medical societies, read them at the meetings of the general societies, and educate the general practitioner as to the fine points in connection with this subject. I am convinced that they do not appreciate the fact that a great many of these babies that are born mutilated, torn and dead, should and can be born alive.

Dr. William H. Humiston, Cleveland, Ohio.—Just a word or two in reference to the contrast between a clean Cesarean section

and the results we see from the high forceps operations. If the mortality was known following the high forceps operation, it would be simply staggering. There is not a month passes, in the hospital with which I am connected that there is not a case brought in, in which high forceps has been used, the child sacrificed, and the woman's soft parts so badly torn that the rectum and the vagina constitute one passage. Often the bladder and urethra are injured, and the woman in a septic condition. I feel that these women should have better obstetric care and advice, and this can be had only through better training in obstetrics in our medical colleges. Many now doing obstetric work do not hesitate on the slightest pretext to attempt high forceps—which is a major operation and requires the greatest skill of any surgical procedure.

Dr. Charles L. Bonifield, Cincinnati.—In order to emphasize one of the points made by the previous speaker, I wish to say that one of the leading obstetricians of Cincinnati told me not long ago that he was called up one night by a general practitioner, a young man of ambition, and nothing else, and asked to assist in doing a Cesarean section. He went to the hospital. The young practitioner apologized for disturbing him at night. The patient was slightly connected with the family by marriage and the young practitioner did not want to assume the responsibility without a little help, and so on. The doctor asked him as to the indications for Cesarean section, and did not get a definite answer, and finally an examination disclosed that the patient was not pregnant at all. (Laughter.)

I think that is a good example of the way some people practice obstetrics at the present time.

Dr. Arthur E. Skeel, Cleveland, Ohio.—There is one suggestion I would like to make in this connection, and that is, the comparison in mortality between craniotomy and Cesarean section in the bad cases is hardly a just one. I should like Dr. Davis at this time, or some other time, to present a little different view of that comparison. He states that the mortality for craniotomy was 15 per cent., and the general mortality rate was 10.7 per cent. for Cesarean section during the entire period. These craniotomies were probably done in the late or bad cases, the infected cases, otherwise craniotomy would not have been done. In the Cesarean section operations the mortality represents not only the bad cases but the good cases. The craniotomies represent in large proportion, cases operated a number of years ago, while the majority of Cesarean sections presented in the same statistics have been done in comparatively recent times. It seems to me, it would be of interest to have a comparison of the Cesareans and craniotomies done in the last five years, showing a comparison of the results as between craniotomies and Cesarean sections done in the same class of cases, that is, the late and infected cases.

Dr. E. Gustav Zinke, Cincinnati.—I feel very keenly the interest the profession takes in this subject; and have contributed my share to the discussions on Cesarean section, for various con-

ditions, during the past fourteen years. I am always very much impressed with what Dr. Davis has to say on this subject. I am also pleased with the clean-cut remarks of Dr. Baldwin, who like Dr. Davis, is one of the thinking surgeons in whose judgment we may trust.

I will not repeat what has already been said except to emphasize the one condition to which Dr. Baldwin referred, faulty presentations. I am vividly reminded of a case I was called upon to attend in labor about twenty years ago. She was a primipara, handsome, perfectly built and in perfect health throughout her pregnancy. I was never able to hear the fetal heart, nor feel the fetal movements. There was no doubt of her being pregnant. I was certain of a vertex presentation, but the position of it could not be determined. She went into labor and was delivered at her home. Dilatation of the os was very slow; the membranes ruptured spontaneously, but there was no descent. After the os was fully dilated and the head remained at the brim in spite of good and forceful contractions of the uterus, the axis-traction forceps were applied. After protracted and careful traction upon the forceps for fully half an hour I began to realize that I was in the presence of an unknown and, at this time, unrecognizable complication. The pelvis was normal and ample. I determined upon version. Upon the introduction of my hand into the uterus I found the cause—an unyielding head, hand, and foot, presenting themselves at the same time. It was an easy task to turn the child; and, after a great deal of an effort I succeeded in delivering a dead child. The mother died of sepsis one week later. If this patient had been in a hospital, and could have received the after-treatment she required, I am sure she would have lived. A Cesarean section would have saved the child; but there was no indication for this operation prior to the second stage of labor and before the introduction of the hand into the uterus for the purpose of version; and then it was too late to perform this operation.

I am glad that Cesarean section has found a wider field of usefulness. It is my firm belief that, *in certain forms of placenta previa*, Cesarean section is the proper procedure. Not every case of placenta previa is one for Cesarean section; indeed the majority of them may be safely delivered without resort to this operation. Nor does it matter whether we have a case of placenta previa centralis, lateralis or marginalis. Any of them may admit of safe delivery with the use of the tampon, balloon dilatation and version. If the case before us is one on which the hemorrhage can be successfully controlled by tampons or the balloon until complete dilatation has occurred, Cesarean section is not indicated. In cases of a vertex and breech presentation this is frequently possible. But it is almost impossible to control the hemorrhage in an oblique or transverse presentation, because the tampon cannot be placed effectively. Nor is it possible to control the hemorrhage, no matter what the presentation, if the placental implantation is pathologic in character. The justification of Cesarean section in placenta previa resolves itself into this: If the hemorrhage can be successfully controlled at all times, Cesarean

section may not be necessary: if it is difficult to control the bleeding, no matter what the implantation of the placenta or the presentation of the child, Cesarean section is justifiable—aye imperative—and will give the most satisfactory result.

Much has been said as to the danger from postpartum hemorrhage from the placental site after Cesarean section for placenta previa. It has been one of the most prominent points urged against Cesarean section in placenta previa. A placenta removed from the lower uterine segment before it is dilated and attenuated by the passing child is not, as experience has shown, attended by serious hemorrhage; but the detachment of a placenta previa following (or preceding) the delivery of a child per vias naturales, is always attended with great loss of blood and many of these poor victims have died of postpartum hemorrhage for lack of sufficient contraction in the overstretched lower segment of the uterus.

You will pardon me if I insist that Cesarean section is rarely, if ever, indicated in cases of puerperal eclampsia. These cases can be very successfully managed medically in the vast majority of instances. I have not as yet encountered a case of puerperal eclampsia in which I believed Cesarean section was justifiable. I have no desire to question the judgment of my friends who differ from me. My own experience with puerperal eclampsia has convinced me that I am right. I simply wish to maintain the position I have taken on this subject.

The high forceps ought to be relegated to the past; not even the skilled, experienced, and well trained obstetrician is justified in their use if his patient is free from sepsis, in aseptic surroundings and if he knows how to make a Cesearan section.

Dr. Davis (closing).—It is very gratifying to me to see such a free and thorough discussion as my paper has brought out and to find that Cesarean section has so large a field. It is impossible for me at this hour to answer the arguments *pro* and *con* that have been made here. I think that there is some danger in the teaching that we should resort to Cesarean section much more frequently than has been done in the past. If that teaching goes out it is liable to be abused. We hear quite frequently, half humorously and half seriously, that the time is coming when every woman will be delivered by Cesarean section. That is a mistake. It is a valuable operative procedure when kept within reasonable limits, and in these neglected cases which depend on a matter of judgment, each should be treated as an individual one and should be managed accordingly. If an obstetricain should do a Cesarean section in a case in which it is not clearly indicated, and the patient should die, it would be unfortunate. But if some other operation is done the mortality is likewise high.

With reference to pubiotomy, I have seen it done (I have not done it myself), and the results to my mind are not alluring.

TREATMENT OF PUERPERAL THROMBOPHLEBITIS.

BY

J. F. BALDWIN, A. M., M. D., F. A. C. S.,

Prof. Clin. Surg., Med. Dept., O. S. U.; Surgeon to Grant Hospital, etc.,

Columbus, Ohio.

WHILE the average mortality of puerperal pyemia is ordinarily regarded as between 67 per cent. and 75 per cent., it is probable that the mortality of pyemia due to infected thrombophlebitis, in which the veins of the broad ligaments, the internal iliac, or the ovarian are involved, is 100 per cent.; at least. I have not been able to find any cases of recovery without operation on record in which such a lesion was demonstrated by subsequent operation or history.

The classical symptoms of pyemia from infected thrombophlebitis are repeated chills, with corresponding wide fluctuations of temperature, with direct evidence to the touch of involvement of the veins of the broad ligaments on one or both sides. It is possible, as in the case reported by Jellett, that there may be no evidence of involvement of the broad ligament, but such a condition is a rare exception.

Treatment of these conditions by vaccines and serums is quite uniformly conceded to be futile, and expectant treatment, if the diagnosis is correct, means a mortality of 100 per cent.

In 1909, J. Whitridge Williams, of Baltimore, contributed an exhaustive article on this subject, in which he made a study of fifty-six operated cases (AMER. JOUR. OBSTET., vol. lix, No. 5). Five of these cases were his own, with one death. Excluding from the entire number of cases certain ones in which there was an error in diagnosis, or technic, he concludes that operative mortality, when the thrombus is limited to the ovarian veins, should not exceed 10 per cent., provided the operation is performed early; when other vessels are involved, the mortality he places at 25 per cent. The operation, he says, should be undertaken as soon as the diagnosis can be made, "which is assured whenever a worm-like mass can be palpated at the outer portion of the broad ligament in patients suffering from chills and a hectic temperature."

The transperitoneal route he greatly prefers to any form of extraperitoneal operation. His technic is ligation of the infected veins beyond the point of extension of the thrombus.

Hiram N. Vineberg (Amer. Jour. Obstet., July, 1913) reports a case in which he excised not only the entire right ovarian vein up to the vena cava, but removed also the uterus. His patient recovered promptly.

In August, 1913, Jellett, Master of the Rotunda Hospital of Dublin (*Surgery, Gynecology and Obstetrics*), presented quite an exhaustive monograph on this subject, in which without hesitation he earnestly recommends operative treatment. He reports five cases with two deaths.

Most of the operators recommend excision of the veins following ligature, but Williams in his monograph states that this treatment is rarely necessary, but that ligation is sufficient.

In my own experience I have operated in four of these cases with one death. The details of the cases are without interest, as they present no unusual features. One followed an induced abortion, the others full-term labor. In all the characteristic symptoms were present. I report the cases because the operative technic which I adopted varied from that recommended by the surgeons who had previously reported. In all of my cases the thickened vein was readily identified, and in two of them, in addition to the ovarian, some of the branches of the internal iliac were involved. All of the patients were in desperate condition, and it seemed wise to complete the operation as rapidly as possible. Accordingly a hysterectomy was made, after sterilizing the vagina and endometrium with iodine, and the vagina left widely opened. The affected veins were then exposed by separating the peritoneum, and cut cross with free escape of rotten blood clot. Care was taken to manipulate the veins as little as possible so as to avoid pushing the clot toward the vena cava. This was especially true after my first fatality. No attempt at ligation of the veins was made, but the pelvis was filled with an iodoform gauze fluff pushed down from above into the vagina, and over this the sigmoid flexure of the colon was stitched around the pelvis so as to completely occlude the peritoneal cavity. As the patients were all young an ovary was saved in each instance. In three of the cases prompt recovery ensued. In the fourth there had evidently been a disturbance of the clot, and death occurred suddenly.

In all four cases the uteri submitted to the pathologist were found by him to contain multiple abscesses, showing that the removal had been wise. By thus detaching the uterus, with ligation merely of the arteries, the veins of the broad ligaments are left free to drain into the gauze fluff, and thus out of the vagina, so that a beginning thrombus in any one of them would most likely

prove harmless. By making no effort to excise or even ligate the veins, a minimum of manipulation and traumatism results, with correspondingly diminished risk of breaking off a portion of the clot to drift into the vena cava.

As the infection reaches the veins through the sinuses in the uterine wall, it is evident that in a large proportion of cases the uterine wall itself is the seat of abscesses, as proved to be true in all my cases, and the removal of the uterus not only gets rid of a source of continued infection, but also gives absolutely free drainage of all the veins that can possibly be directly at fault. These veins are usually without valves, and with a free opening at the bottom where the infected clot is breaking down, the contents would naturally extrude in that direction, instead of extending upward, as must necessarily be the case when no direct down drainage is secured. The fatal case I here report more at length:

Mrs. E., aged twenty-six. Married eighteen months. One early miscarriage about a year before. Was delivered by her physician, April 22, 1914, with forceps, the instrument being applied with the head on the perineum, and without laceration. Thirty-six hours later she had a chill with a temperature of 105°. She had daily chills from that time until the 26th, when I saw her in consultation. Blood count, 23,000 leukocytes, 90.6 per cent. polynuclears. Vaginal examination showed some laceration of the cervix on the right side. In the left broad ligament, however, was found the typical condition showing infection at that point. Right broad ligament entirely free. Vaginal discharges odorless. I advised expectant treatment of the case for a few days, but with operation later if the conditions did not improve. April 27 the patient's condition was pretty fair all day. No chill, but continued high temperature. On the 28th and 29th no chills, but general condition not so good. Temperature 104°. Some tenderness now in the right broad ligament as well as the left, but could make out no distinct mass on that side. Operation advised.

Operation.—Median incision. The veins in both broad ligaments were found involved, the infection extending on the left side into the ovarian and also into branches of the internal iliac. A pan-hysterectomy (except the ovaries) made in the usual way, with wide drainage of both broad ligaments, the posterior vaginal wall being split for the passage of an ample gauze fluff, over which the sigmoid was attached all around to the peritoneum.

Examination of the uterus showed the entire placental area to be infected, while the inner surface of the entire cervix was sloughing. Minute abscesses in the walls of the uterus on both sides.

For forty-eight hours the patient materially improved, except that her pulse and temperature failed to subside as much as had been hoped. She reported herself as feeling fine. On the morning of May 1 she seemed a little better, and when seen about six

o'clock that evening had apparently held her own nicely all day. I was called out of the city at that time, and when I returned at 10:30 P. M. found her dying, with every evidence of plugging of the pulmonary arteries. Death was attributed to a breaking loose of a pelvic clot.

DISCUSSION.

Dr. Abraham J. Rongy, New York City.—Mr. President: In these cases of septic thrombosis, no time should be lost in treatment with stock or autogenous vaccines, for if they are to be operated and there is any chance at all from operative interference, it should be done early. If you should lose twenty-four to forty-eight hours with vaccines so much more is lost and the patient's chances for recovery are much more unfavorable.

Dr. John Norval Bell, Detroit.—I must confess, that I am on the conservative side of this subject. I am sorry that Dr. Huggins is not here, as he has done some operations for these conditions. It does not seem to me that you can operate, unless one is very expert, without stirring up these veins, and the danger lies in the infected clot getting off into the circulation. A man must have a great deal of surgical ability to get good results. However, I am glad the subject has been brought up, but I must frankly say that I am on the side of the conservatives in the treatment of thrombo-phlebitis.

Dr. Baldwin (closing).—I am naturally a born conservative. I was a general practitioner, and an obstetrician of pretty large experience, before I was forced into surgery. I am sometimes sorry that I did not stay in obstetrics. I think, however, the records will bear me out in the statement that when we have a condition such as I have described, and as described by the writers to whom I refer, we have a mortality under conservative treatment of exactly 100 per cent. We have all had cases of infection of the broad ligament, but without extension of this infection into the pelvic veins, and these cases under conservative treatment may get well after weeks or months, or frequently after opening through the vagina an abscess which has formed in the broad ligament. But when, on the other hand, the renal vein, or branches of the internal iliac, become involved, and are discharging their infectious contents directly into the vena cava, with repeated chills and high temperatures, these patients die. I think they always die, and if recovery takes place a mistake was probably made in the diagnosis. If, therefore, in these cases we have a mortality under conservatism of 100 per cent., something more radical should be done. According to Dr. Williams' report, which was published several years ago, he had one death out of five, and if these cases can be handled with a mortality of 20 per cent., or even a much larger per cent., there is certainly a fair percentage that we can save. I have had four cases and saved three. That is certainly worth while. But in all these

cases we must be sure of the diagnosis, and for that purpose we must consider the history as well as the physical condition. Williams says that if we get a history of repeated chills, with a high rise of temperature and a rapid fall, giving an excursion perhaps of 10 degrees in a day, and if on examination you find these enlarged veins on one or both sides, the diagnosis is established, and on opening the abdomen you will find the infected veins feeling like hard cords, extending upward. If it is the ovarian vein it will stand out almost like a broomstick. It pushes itself prominently forward.

I agree with what has been said as to the danger of manipulating these parts by the inexperienced operator, since he may thus express into the vena cava a large infected clot. If, however, the uterus is pulled up and removed in the usual way, with the least possible manipulation of the infected veins, the danger is much less than if the ovarian veins are manipulated by dissection in an attempt to reach their point of entrance into the vena cava on the one side, or the renal vein on the other. It is at this upper end where we are most likely to break off the clot. A minimum of manipulation means a minimum of danger of extruding the clot.

Dr. Humiston, Cleveland.—I would like to ask Dr. Baldwin where he makes the opening in the vein and how large?

Dr. Baldwin.—If the uterus is large I bring it up, assuming it is at full term, and make a pan-hysterectomy in the usual manner, though in one of my cases I left the cervix. As the infected vein is cut across there is a little gush of necrotic clot which is, of course, carefully wiped away. The veins are left wide open, but the arteries are ligated as usual. The vein can be easily felt, indeed, it makes itself very prominent as it passes over the brim of the pelvis. The vagina is then widely opened, a fluff of iodoform gauze passed down from above and left so as to fill the true pelvis and cover over the open veins. Over this fluff is swung around the sigmoid and attached by catgut stitches so as to make a complete floor of the abdomen and roof of the pelvis. It seems to me that this procedure inflicts a minimum amount of traumatism, and gives the patient the chance for recovery to which every patient is entitled.

Dr. E. Gustav Zinke, Cincinnati.—Have you had any experince in the use of autogenous vaccines in these cases of puerperal infection where the parturient tract has been clear of the infection, but where the infection has gone beyond?

Dr. Baldwin.—We have a man right in the hospital who is skillful in making autogenous vaccines, and fortunately for some of us who are slow in the faith he is quite enthusiastic. On two occasions he used autogenous vaccines. If there is time for their administration, and while waiting to determine positively the diagnosis before resorting to operation, their administration is justifiable, but I deem it inadvisable to delay surgical interference while merely awaiting possible benefit from such vaccines or any of the serums.

REPORT OF A YEAR'S WORK WITH THE ABDERHALDEN REACTIONS.

BY
A. J. SKEEL, M. D.,
Cleveland, Ohio.

The work of Abderhalden in establishing the serological ferment test for pregnancy is too well known to require any discussions of its principles. Since its announcement a large number of workers the world over have been busy and have published their results from time to time. The wide discrepancies in these reports have doubtless been due to a variety of causes.

Undoubtedly the apparent simplicity of the test led some unprepared workers into the field with inevitable failure as the foreordained result. Many of them have more recently published later reports showing the cause of early failures.

However, in spite of the improved technic, and greater skill of the workers as their experiences with the method has increased, widely varying reports continue to come in. In view of the fact that many differences of opinion still occur among the most competent observers, with regard to various phases of the test, it is apparent that much work remains to be done before the reaction is removed from the academic to the clinical field.

There is one incontestable, underlying fact about the Abderhalden reaction, viz., that by it in pregnancy cases, we may demonstrate the presence in the blood of a ferment or ferments which, at body temperature, are capable of breaking down the proteid molecule of placental tissue into smaller particles dialyzable through a membrane, which will not permit the passage of the unbroken molecule.

By means of this reaction it has been conclusively shown that such a ferment is, with rare exceptions, constantly present in the blood serum of normal pregnancy. The problems which still confront the workers along this line are numerous, but some of the principal ones may be stated as follows:

(1) *The Test.*—Can some simpler method be devised for demonstrating the presence of the ferments? The optic method with the polariscope seems to be too difficult for general use.

Abderhalden and Fodor have announced a third method by determination of the nitrogen in the dialysate and are working on a staining method.

Engellhorn and Wuintz have announced a placentin skin reaction, similar to the tuberculin and luetin skin inoculation tests. They used a placenta extract for the test, and report good results, but have refrained from giving out their method of preparing placentin. If their report is confirmed it is important. P. F. Williams has been trying out a coagulation and filtration method. Simpler methods should be constantly sought for.

(2) *Normal Pregnancy.*—Does it ever happen that during the course of a normal pregnancy the ferments are temporarily in abeyance or absent, or are negative results due to faulty technic? Only larger statistics can answer conclusively. Whenever possible, a negative test in pregnancy should be immediately repeated to answer this question. More reports are needed in very early pregnancy and in postpartum cases to determine how early and how late the reaction is present.

(3) *Pathological Pregnancy.*—Are the pathological conditions of pregnancy, particularly pernicious nausea and vomiting, and eclampsia associated with any changes in the activity of these ferments? The early suggestion that these conditions were due to inactivity of the protective ferment, seems to be contradicted by the fact that nearly all of the workers find the reaction present. Some emphasize that the reaction was very strong in eclampsia.

Does syphilis or the administration of antisyphilitic remedies, such as salvarsan or neosalvarsan, affect the activities of the ferment? Petri found the reaction present in luetics who had received active treatment.

(4) Is the reaction specific, *i.e.*, is the ferment present in pregnant blood serum capable of digesting placental albumin only, or will it digest other albumens, *e.g.*, cancer, sarcoma, normal uterus, etc.? Will the ferment present in the blood serum of malignancy cases digest its corresponding albumen invariably? Will it also digest placental albumen?

(5) Is the reaction tissue system specific, interaction occurring among a particular set of organs, *e.g.*, generative, digestive? If dependent upon the tissues involved, does this specificity relate to organ function, or to embryological origin of these tissues?

Positive statements widely at variance with regard to specificity, all by competent men, remain as yet unexplained. Apparently only visiting each others laboratories for personal observation of methods can clear up some of these differences.

(6) To what extent, if at all, is the reaction brought about by inflammatory process in the body? Upon the successful working out

of answers to these problems, depends the future use of the ferment test clinically.

The data given below comprises a year's work, a partial report of which was made last spring before the Cleveland Academy of Medicine.

Main points in present technic:

(1) Absolutely fresh placenta; complete freeing of the tissue from blood by repeated washing in water and finally in physiological salt solution; repeated boiling.

(2) Careful testing of the prepared material for reaction to ninhydrin.

(3) Preservation in small pieces in equal parts of water and chloroform overlaid with toluol.

(4) Retesting of the material each time before using.

(5) Securing the blood in dry sterile test tubes. Blood is allowed to stand for separation of serum. It is not centrifuged.

(6) Serum obtained by pipettes cleaned with water, alcohol and ether.

(7) Use of only fresh serum for the test.

(8) 1.5 c.c. of serum on placental albumen within the capsule.

(9) 20 c.c. of water for the dialysate. Both serum and dialysate overlaid with toluol.

(10) Incubate at 37°C. for eighteen hours.

(11) 5 c.c of dialysate tested by 2 c.c. of 1 per cent. ninhydrin, boiling one minute and allowed to stand thirty minutes.

(12) The serum for the control tube must be from the same patient, as the tested blood; inactivated at 56 centigrade for one-half hour.

(13) Even the faintest pink or purple color is read as positive. Straw color or no change is negative.

(14) The control must be absolutely negative or the test is regarded as faulty.

(15) Commercial peptones proving unsatisfactory for testing capsules, we are now testing them by running parallel series both Nos. 1 and 2 tubes with known good capsules.

(16) Capsules cleaned by prolonged washing, and boiling for one to two minutes. The No. 579 A Schleicher and Schüll capsules are used.

We have naturally at different times been subject to the various errors both known and unknown which make this work so difficult. The best safeguard against technical errors leading to false conclusions is in careful control not only by the inactivated serum, but by

running several bloods at once. We ran three to eight bloods with their respective controls in most of our tests. The value of this is illustrated by some of our failures. Six known pregnant bloods were run on contaminated placental albumen—five positives in both tubes, and one negative in both tubes showed conclusively the faulty technic. On another occasion five bloods were run and incubator trouble caused complete failure of the test.

We secured nine pregnant bloods at another time. Six were immediately run through, all being positive with negative controls. Three were placed in an ice box at a temperature of 5 to 6 centigrade. After twenty-four hours these were taken from the ice-box and run through. All of them were negative. These were not included in our tabulation because not fulfilling one of the prime requisites of the test, viz., fresh blood. It is possible that the low temperature destroyed the activity of the ferment. Eight times we were obliged to throw out individual tests because of positive controls, due probably to old bloods, unclean glassware, failure to overlay with toluol, etc.

Altogether we had twenty-two cases during the year in which demonstrated errors caused the results to be unreliable. One case in which a negative report in a pregnant patient was relied upon, in connection with the history, led to a serious clinical error.

The suggestion of Schwarz to run two capsules of the blood under examination in addition to the controls, is a good one, and will diminish the chances of error due to a faulty capsule. In addition every test upon which clinical action depends should be run with several known pregnancies. As a further control, an unexpected negative, or a negative in a diagnostic case, should be confirmed by immediate testing of the capsule. A second blood should be then secured from the patient and the test repeated.

	Positive	Negative	Total
Known pregnancy serum on placental albumen	117	4	121
Postpartum to three weeks placental albumen	9	1	10
Known pregnancy serum on cancer albumen	5	2	7
Nonpregnant serum on placental albumen	27	74	101
Cancer serum placental albumen	9	2	11
Cancer serum on cancer albumen	8	2	10
Sarcoma serum on cancer albumen	1		1
	176	85	261

Of the eleven cancer cases, eight were positive to both placental and cancer albumen. Two were negative to both. One was not

tested to cancer albumen. Among nine eclamptics and severe preeclamptic cases, eight gave positive reactions of usual intensity. One was negative. Syphilitics both before and after salvarsan showed the usual reactions. Of sixteen sexual perverts from the Cleveland State Hospital, all nonpregnant, eight were positive and eight negative. Of the positive nonpregnants, nine were cancer, three fibroids, one pseudocyst, four inflammatory conditions, eight sexual perverts, two unexplained. Total twenty-seven.

The reaction in our small series of sexual pervert cases suggest further investigation along this line. May it have to do with tissue system reactions? In future cancer case we will endeavor to specify the location of the growth and the source of the cancer albumen.

Conclusions.—(1) The Abderhalden ferment test is delicate and requires great care and considerable experience for successful work. (2) Because of the great variety of conditions which may give the reaction, positive result cannot be taken as conclusive evidence of pregnancy. (3) The negative reaction, if repeated, and well controlled, is quite reliable as an indication that the patient is not pregnant.

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DISCUSSION.

Dr. Asa B. Davis, New York City.—I know very little about this reaction. However, I think we ought to commend the work which Dr. Skeel has been doing and encourage him to keep on with the same. We have used this test in about 150 cases in the Lying-In Hospital in the last year and a half, but at the present time no definite conclusions can be drawn. We are not satisfied that there is very much in this reaction. It is too delicate and uncertain to be of any particular value, although of great scientific interest at the present time.

PREGNANCY AND INCIPIENT AND INACTIVE TUBERCULOSIS.

BY

WILLIAM GORDON DICE, M. D.,

Toledo, Ohio.

It is estimated that there are at least 32,000 women in the U. S. suffering with active tuberculosis, but as to the number of incipient and inactive or healed cases, one could scarcely venture a guess. Until there is more uniformity in the diagnosis and classification of these cases, accurate data are impossible. Statistics of one sanatorium showed 25 per cent. of its cases to be incipient, and even though the same percentage obtained in all, we know that but a small number of tubercular cases go to sanatoria.

Bacon states that 1 to 1.5 per cent. of all women becoming pregnant have tuberculosis of the lungs, such as to be diagnosed if careful examination is made, and Freund found, in a series of 1000 pregnancies, there were twelve cases of tuberculosis; six of which were in a serious condition.

It is reasonable to conclude that of the cases of tuberculosis becoming active within a few months after delivery, the majority were undoubtedly incipient before or early in pregnancy. Lobenstine, before this Society, in 1912, cited the following to prove that pregnancy and labor are responsible "for the development of tuberculosis in susceptible individuals and may cause a dormant tuberculosis to rekindle. Fishberg states that 37.4 per cent. of his tubercular cases dated their first symptoms from childbirth; Maragliano, 59 per cent.; and Trembley, 63 per cent. whose ill health after childbirth ended in tuberculosis."

In the course of ten years experience as examiner for several insurance companies the large number of cases of tuberculosis in the family history dating their illness from childbirth has attracted my attention. In view of all these observations, we must conclude that pregnancy is an etiological factor to be considered in tuberculosis.

Few medical men will be found to-day who hold to the old view, still held by many of the laity, that pregnancy benefits a tubercular case. We now believe with DeLee "that pregnancy tests the integrity of every organ in the body, and if any of them is diseased, the fact will usually be brought out."

That improvement is occasionally seen even in an active case of tuberculosis during pregnancy, will be admitted by all, but it is the exceptional case that does not go down more rapidly after the confinement, if the decline does not begin in the later months. Improvement is probably seen more often in an incipient or inactive case as the result of the stimulation to the general nutrition, the better hygiene and the less active life, but when the apparently protective influence seen in pregnancy is removed and the strain of labor and drain of lactation have lowered the vitality and lessened the resistance, the latent or inactive process becomes active and the disease often progresses rapidly. One writer estimates that fully 75 per cent. of slightly active tubercular cases are aggravated by pregnancy and labor and, as stated before, statistics do not separate the incipient and mildly active cases.

What should we consider an incipient case? Where, to the patient's knowledge, she has not felt badly more than four or five months, has lost a few pounds in weight, runs a temperature up to 99 1/2° in the afternoon, has a slight catarrhal condition in one lobe or one apex with evidence of slight infiltration, very limited in extent, such a case should be considered an incipient tuberculosis. A diagnosis cannot often be made save after repeated, careful examination of the chest and close clinical observation.

That the average man in general practice does not diagnosticate tuberculosis in the incipient stage is certain. Not infrequently the ablest internists overlook them and, doubtless, obstetricians and gynecologists do the same. Lobenstine found in his cases, that while some of the mild ones stood the strain of pregnancy with but little apparent damage, in from 35 to 60 per cent. the tubercular condition was aggravated, and it is fair to conclude that incipient cases would fare no better. The early months, with their nausea and vomiting, often interfere with the general nutrition and even though the patient puts on flesh and gains strength during the middle period, it may give way to impaired health during the last two months when the lung is embarrassed by the pressure from below or, if the patient goes through labor in good condition, the period of lactation all too often brings on renewed activity.

The management of an active tuberculosis complicated by pregnancy presents its problem, but probably a less difficult one than the incipient and inactive cases; the problem is greater than in the active case because we have every reason to hope and expect that under favorable conditions, these incipient cases will get well, that is, clinically well.

What then should be the attitude of the obstetrician or physician toward the incipient tubercular case? In the first place, such a patient should be advised not to marry until well, or, if married, she should be warned of the deleterious effects of pregnancy in the large majority of cases. In all who are married or marry against our advice, which most of them do, we of course advise abstinence, though we do it knowing that it will not be practiced, and we realize that preventive measures are usually failures in the end. There is nothing so disheartening to the physician who has been watching an incipient case, noting its gradual improvement, as to have a pregnancy set in to complicate the situation.

In every such case we should first ask for a consultation with a competent internist and if tuberculosis can be demonstrated clincially to the satisfaction of both men, a therapeutic abortion should be advised and urged. Therapeutic abortion is justified in incipient tuberculosis on the assumption that the patient, if allowed to continue in her pregnancy will suffer serious injury and that an abortion will avert this danger. If performed, it should be done as soon as a definite diagnosis of pregnancy is made and this should be possible in primiparæ before the twelfth week. Rapid dilatation and curettage under anesthesia is sufficient, following which the patient should continue under the most approved tonic and hygienic treatment.

The mortality and percentage of relapses, according to Trembley, who has had a wide experience in these cases, is *nil* when the abortion is induced before the end of the third month.

It is difficult to convince the average woman of the dangers of an incipient tuberculosis, for the most intelligent are all too often prone to regard it all too lightly, and even though she may not object to an abortion, few would be willing to submit to temporary sterilization, however advisable it might be. For such as will submit to this, various procedures have been brought forward, but the most certain probably, is the bringing of the uterine end of the tube under the peritoneum or within the broad ligament. If the patient recovers from her lung infection, by a subsequent operation the ends of the tube are reunited. In view of the fact that pregnancy may not occur, the operator should be safeguarded by a written agreement signed by the parties concerned.

If the incipient case is a problem, the healed one is even more of one. There are two classes of these cases; first the early cases in which the patients are apparently cured, where the process is arrested and second, those in which the disease was fairly well advanced but

has been inactive for two or more years—the early and the late healed cases. By a healed case, we mean, one in which the patient has no fever, is up to normal or above average weight, with good nutrition, and good endurance. There may be areas in the chest showing more or less involvement, areas giving physical signs, such as dullness and vocal fremitus, or in the late cases even râles; but, aside from this, the patient is normal.

In every healed case the *x*-ray is a valuable aid in determining the extent of the previous involvement and should be invoked whenever possible. In early cases, pronounced cured or arrested by a competent observer, how long an interval should elapse before pregnancy is allowed? Heretofore, a year's freedom from symptoms has been deemed sufficient; but internists and tuberculosis specialists now feel that this is too short a period, and the time should be lengthened to at least two years.

Von Bardeleben maintains that old healed nonactive tubercular processes do not furnish an indication for abortion, but advises that the condition be most carefully watched on account of the possibility of reactivation. While Trembley states that cases, apparently cured, having remained without symptoms for at least a year, may be allowed to go to term under most careful supervision, he has found that nearly every quiescent or arrested tubercular case, when becoming pregnant, had a serious renewal of activity and resulted in the dissemination of the disease throughout the pulmonary system and even attacking other parts of the body. DeLee says, "if a dormant tuberculosis awakens in pregnancy or a new infection occurs, the course of the disease is apt to be more rapid, being usually of the more florid type."

In any healed case, when pregnancy ensues, the patient must be kept under careful observation, if possible in a suitable climate; she must be well fed with good nutritious food, and avoid exhaustion and fatigue; every thing should be done to conserve her strength. If there is much nausea and vomiting, the danger of weakening her resistance is increased. The temperature and pulse should be watched, the weight taken frequently, and exercise and sleep regulated. This care should be redoubled during labor, shortening its duration by the timely use of forceps in the second stage, and using every precaution to avoid infection and hemorrhage. At the best, the mother's strength has been sorely tested by the pregnancy and labor and lactation cannot but add to the drain, so it must be the exceptional case that is allowed to nurse the infant at all.

If a healed case is *reactivated* by the pregnancy in the early months

as a result of the vomiting and consequent loss of strength and resistance, an abortion may be advisable; but we must realize that the tubercular process may not again be arrested by this procedure and that unless the original infection was very slight, the disease is not apt to be shortened. In all such cases we must really individualize. A woman going through pregnancy is going through the hardest kind of work and we must decide whether she is able to stand such work before we consent to her becoming pregnant. Many healed cases go to full term safely, but there are no statistics available that are convincing. The physician must necessarily be somewhat of an alarmist in all these cases; the circumstances and environment of the patient all have to be considered in advising these cases with respect to pregnancy or if pregnant as to its interruption.

In addition to those cases of active tuberculosis dating from pregnancy, of which statistics were cited early in the paper, there is a class of mildly-active or reactivated cases following pregnancy that do not go to lung specialists first, but to the family physician, or gynecologist. As young women they may or may not have been rugged, usually not, but after marriage they have become pregnant and given birth to one or more children which they have nursed varying lengths of time. During pregnancy they put on flesh and feel well, in fact look better and feel better than ever before; they go through labor and the early puerperium without complications, but following the weaning of the child, or in the later months of lactation, they have run down, lost flesh and strength, look badly and feel worse than before pregnancy. They may have some symptoms referable indefinitely to the pelvis, and if they consult the one who delivered them or a gynecologist, he is apt to think their poor health entirely dependent on a slight laceration of the cervix or relaxation of the pelvic floor. If operated, some of the local symptoms may improve, but the general health remains the same, there is no improvement.

In every gynecological case, a complete and thorough examination should be made in order to discover, if possible, all the factors having a bearing on the case. If such a case is so examined, we find the patient running a little temperature, possibly not over 99.5°, or it may be subnormal in the morning; there are no definite lung-symptoms save vague chest discomforts and little or no cough. But the patient is much under weight, has poor appetite, sleeps poorly, and has no endurance. Examination of the chest shows evidences of an incipient tuberculosis, a changed breath sound, a very slight dullness

over one apex or small area of lung, with a few râles and slightly increased vocal fremitus.

The radiograph will often show the condition better than the physical examination save to an expert. Instead of an incipient tuberculosis, we find areas of calcification, and elsewhere areas of slight infiltration, or perchance an area of calcification surrounded by an area of new infiltration, which is, presumably, the healed lesion after one pregnancy with the active lesion of the succeeding pregnancy.

If the patient has had more than one pregnancy, we find each convalescence more protracted than the previous one. Nature endeavors to render the lesion inactive by a process of calcification, but in all probability bacilli still lurk within the lesion, ready to light up a renewed process so soon as the resistance is below normal.

Finally nature rebels at the repeated burden thrown on her and, if after the third or fourth pregnancy, the patient does not have a very active process started up, terminating fatally in a short time, she enters on a long period of ill-health with a slow fibroid type of tuberculosis.

Such cases must have been met by nearly every one here, and they emphasize the importance of most careful examination of the chest of each and every case coming under our care as obstetricians or gynecologists. When the condition is once recognized, future pregnancies must of course be interdicted.

If there are pelvic conditions giving rise to real symptoms such operations as may be necessary should be done, but the patient should be given to understand that the real cause of most of her ill health is in her chest, and not in her pelvis. Since future pregnancies ought not occur, the question arises: Should these patients be sterilized?

In progressive tuberculosis Bacon and Hoehne, as well as others, have advocated operations on the tube; Bumm and Martin have advocated hysterectomy; Bardeleben, excision of the placental site per vaginam, and Gauss, *x*-ray sterilization. But it will be the rare cases of this type of tuberculosis that would submit to any of the more radical procedures, for the operation itself might so lessen the vitality and resistance of the patient as to light up the latent process, even if the operative mortality were nil.

DISCUSSION.

Dr. Ross McPherson, New York City.—This valuable contribution of Dr. Dice is most important and timely, for the reason that it calls attention to a condition which is more neglected than almost any I know of. Dr. Dice has made the statement that the average

practitioner considers the tubercular condition either of very little importance or else gives up hope of doing the woman good. That has been our experience in the Lying-In Hospital and in private practice, and the cases which the doctor has cited bear a close resemblance to those we see in practice. The paper also illustrates another point, which is, the importance of the obstetrician being something besides an obstetrician. He must examine the chests of his patients, and if he does this as a routine procedure, and occasionally does it afterward, he will become familiar with the conditions of the lungs and heart, and thus get a general viewpoint of the patient which he will not get in any other way. While a practitioner may be careful about pelvic measurements, urinary examinations, the Abderhalden test and reactions, etc., it is most essential for him to get a careful history, examine the chests of his patients and do something besides limiting his attention to the pelvis.

We have just had an illustration of the great value and importance of having an *x*-ray plate made, particularly where there is any doubt about the chest conditions and by so doing you will many times be able to detect lesions that you could not possibly make out with absolute accuracy by the use of the ordinary methods of examination.

In regard to the treatment of tuberculosis, it is mainly rest, and as Dr. Dice has so aptly said, when a woman is pregnant every organ in the body has to work over time. When we make a diagnosis of incipient tuberculosis that is active, the uterus should be emptied and where the woman will not consent to have this done, or where the husband will not consent to it, one should explain to the family that they must expect a fatal issue on part of the mother before long. These women go down hill rapidly in the last months of pregnancy, and one of the cases reported is a beautiful illustration of the bad practice of letting the condition go on if it can be avoided. I believe that in every case of incipient tuberculosis accompanying pregnancy that the pregnancy should be interrupted, and that there is no exception to this rule.

Dr. Arthur E. Skeel, Cleveland, Ohio.—I wish to express my appreciation of the doctor's excellent paper and its importance. Personally, I have for some time felt a great deal of doubt as to the proper management of some of these cases. It has seemed to me from the data which we have had and which we have been taught from our college days with regard to this matter, we should have somebody's statistics based on the result of modern methods of treatment of tuberculosis, and I am very glad indeed that Dr. Dice has given us this paper.

I have had two cases that made me question somewhat as to what should be done. I have one patient who, when she was two or three weeks pregnant, developed tuberculosis and consultation with an internist led him to urge that an abortion be performed. She refused. . . . She ran a temperature of 101–102°, and had apparently quite a serious condition. She refused to have abortion induced, and much to our amazement she went right along, recovered during her

pregnancy from all symptoms of the condition, and a year later was all right.

I have within the past month delivered another woman whom I delivered two years ago, but who shortly after delivery developed a tuberculous condition. Possibly she was tubercular when she was pregnant. At any rate, she developed active tuberculosis after delivery, was quite sick for a number of months, was treated by a Pittsburg internist, and pronounced cured two months ago. To my consternation, she came to me five or six months pregnant again, saying she had been pronounced cured, and that she was now pregnant. I saw her a month ago. I shall watch with a great deal of interest the future progress of the case. She is apparently well.

These cases make me wish we had some reports of the results of pregnancy in tuberculosis under modern conditions of treatment and modern ideas of therapeusis.

I am very grateful to Dr. Dice for having presented this paper.

Dr. Gordon K. Dickinson, Jersey City, New Jersey.—Habit rules us all. When a woman comes to your office and you examine the urine and have taken the blood pressure, you think you have done all that is necessary. A few statistics will tell you you are wrong in that matter. Tuberculosis, according to the opinion of clinicians, in the last few years, and according to the very elaborate researches of Khon of Prague, and Mueller in Vienna, always begins in childhood. They base statements upon 2000 observations. They say it is impossible for an adult to get a massive dose of bacilli sufficient to produce tuberculosis in him. It always begins in childhood. It is stated that 90 odd per cent. of all children have tuberculosis; that one adult in six has it existing actively. Tuberculosis is never cured; it is always latent, consequently the women you are confining are tuberculous, often the woman that you are going to confine may have some active lesions in her, and if you would do your whole duty as obstetricians, you must do something more than examine the urine and take the blood pressure.

Dr. John Norval Bell, Detroit.—Regarding the treatment of pregnant women in whom pregnancy is complicated by tuberculosis, I cannot agree with the dictum of the essayist and the opinion of Dr. McPherson, that every case should be aborted. I believe a woman with incipient tuberculosis should be allowed to have her first baby, but that is all. I have seen one case with incipient tuberculosis where there was a temperature which varied from 99° to 100° and a fraction, but this patient under the treatment of a competent man who made a specialty of tuberculosis, was allowed to continue in pregnancy. The sputum test and radiographic findings were positive. We took a chance because she was anxious to have a baby, and if Dr. McPherson were a woman and wanted to have a baby, I am sure he would take the chance. She went through her pregnancy, and became perfectly well. She is to-day a well woman, and weighs 20 pounds more than she did before.

Dr. William Seaman Bainbridge, New York City.—Dr. Dice

has presented a very thoughtful and able paper, showing much painstaking effort in the correlation of the facts upon which to base his conclusions. It seems to me, however, that he has not made perfectly clear the real purport of his theme, in that he does not confine himself to pulmonary tuberculosis, as I am sure he must have intended. None of us would be willing to take the position of advising an abortion in the presence of an active tuberculous process anywhere in the body. In closing the discussion I hope Dr. Dice will clarify this particular point.

I would like to ask the essayist a few questions: (1) Has he been able, by his researches, to determine why a pregnant woman is more likely to have a preexisting tuberculosis become active? (2) Is this due to the limitation of the respiratory movements? (3) Is it the result of the general depletion of the body as a whole? If this be true, why is it that the sign of improved nutrition, the putting on of fat, is found in a great many of these cases of pregnancy? We consider a gain in weight in tuberculosis as an evidence of improvement. (4) Has there been any special study, in these cases, of the blood serum? In cancer work it has been demonstrated that the serum from a pregnant woman's blood, placed in contact with cancer tissue in the laboratory, will cause the cancer cells to grow more rapidly than when the serum from the blood of a nonpregnant woman is used. This increase in the division and subdivision of cancer cells shows stimulation more than under ordinary blood serum. This is a most interesting line for investigation. (5) In relation to the pronouncement that these women should be relieved of the intrauterine condition, has anything been done with reference to tuberculosis elsewhere than in the lungs? (6) If we are right in advising abortion in cases of tuberculosis of the lungs, how far are we justified in going in the presence of tuberculosis in other parts of the body? Recently a pregnant woman consulted me with reference to tuberculosis of the knee. Are we to have a sweeping increase in the number of therapeutic abortions for surgical tuberculosis? This seems to me to be very dangerous ground, and I feel that the Society cannot take, even by inference, any such position at this time.

Dr. Ross McPherson, New York City.—Dr. Bell is arguing from one case, and if we are going to do that we can always bring up any type of case, and quote one or two which are exceptions to the rule, but I spoke from an observation of a number of cases. We have no way of determining whether the particular individual patient will do badly or well; if you wait until the woman gets through her pregnancy she may have acquired a permanent tuberculosis, and Dr. Dice has shown that the majority of them *had* acquired permanent tuberculosis when delivered. It is true some of these women will go through pregnancy perfectly, and if a woman is bound to have a baby that is her privilege. I agree with Dr. Bell in that respect.

Dr. E. Gustav Zinke, Cincinnati.—I have nothing to add to what has been already said except to refer to the dictum of Auvard: Jeune fille—pas de mariage; femme—pas d'enfents; mére—pas

d'allaitement. (Young girls—must not marry; women—must have no children; if they have children—they must not nurse them.)

Dr. Dice (closing).—The point made by Dr. McPherson is well taken in regard to our advice in these cases. We advise the majority of women to have their appendices taken out if they have an acute appendicitis for we feel that is the best advice, yet many get well without operation. Twenty per cent. or more of these women with incipient tuberculosis go through pregnancy and do not get worse or go down rapidly, but we know the majority of them do, and acting on that we give the patient our advice.

With reference to the question asked by Dr. Bainbridge, I cannot say either from my reading or from investigation as to whether anything has been done along the line of serums or not, or just why it is that these patients get up a more active condition in spite of the fact they do put on flesh. We do know that many patients put on 30 or 40 pounds during pregnancy, and yet they lose it rapidly if they nurse their children. Some do not to be sure, but my observation is the large majority of them lose most of the flesh they put on if they nurse the children successfully.

Regarding surgical tuberculosis, I have not investigated that question.

There is one point I want to make, and that is to urge all obstetricians and gynecologists to examine the chests of their patients.

LABOR IN ELDERLY PRIMIPARA.

BY

J. R. FREELAND, M. D.,

Pittsburgh, Pa.

At what time a woman may be classed as an elderly primipara is as indefinite as are most attempts at classification. With advancing years there is supposed to be an increased proportion of connective tissue in the cervix uteri, which is generally credited with being the cause of the prolongation of labor observed in some elderly primiparæ. It is doubtful if this increase of connective tissue of the cervix can be demonstrated, except after the menopause when the uterus takes on its senile character. If we are to judge of the amount of connective tissue in the cervix by the slowness or rapidity of dilatation and the character of the os, then age is certainly not, in my experience, a determining factor, as prolonged labor, slow dilatation of the os with tenseness of the cervix occur in young as well as in old primiparæ. If age has any effect on the uterine tissue it is demonstrated by weakening of the muscle tone with consequent inefficiency of the uterine contractions. This results in uterine inertia, the real cause of prolongation of labor, which is so commonly attributed to rigidity of the cervix.

If the average duration of labor is to be regarded as the determining factor in classification, it brings the age limit down to such an extent that a large percentage of patients in the better walks of life would have to be classed as elderly primiparæ. So, too, scattered through all ages, but increasing slightly in frequency in proportion to age, are cases of uterine inertia and prolonged labor in no way distinguishable one from another.

Consequently the dividing line must be an arbitrary boundary, placed according to the judgment of the individual observer; and, in putting it at thirty years, I follow the custom of other American obstetricians, who make the division into practically two equal fifteen-year periods. This can be conveniently subdivided into five-year periods. While some cases escape this grouping, they are so few as to be negligible. The youngest primipara I attended was just past thirteen years and had never menstruated. She was twelve and one-half hours in labor and delivered herself of a seven and one-

eighth pound child without difficulty. The oldest primipara was forty-six years old and was seven and one-half hours in labor, delivering herself spontaneously of a six and three-quarters pound child. With these two exceptions all of our patients were between fifteen and forty-five years of age.

In a series of cases from the Interne Department of the Rotunda Hospital for twenty-eight months, to which I have added 200 cases from the obstetrical ward of the Western Pennsylvania Hospital, there were 4996 deliveries of which 1812 were primipara and 3184 were multipara. Of the primiparæ, 242 were over thirty and 1570 were under thirty years of age.

The average duration of labor for the older group was twenty-three and two-thirds hours, and for the younger it was twenty-one hours, a trifling difference, particularly when a reference to the statistical table shows that the duration of labor in patients from thirty-five to thirty-nine years was greater than in those over forty years of age. Of course, there were only sixteen patients over forty years, too small a number upon which to base definite conclusions, but the fact remains that if age has any effect on the length of labor, it should be manifested even in a small series of cases, other things being equal. In the individual cases the longest labor was in a primipara twenty-two years old. She was 110 hours in labor.

In spite of the comparatively small difference in the duration of labor there is a marked difference in the frequency of the need for forceps and in the occurrence of lacerations of the perineum, both of which showed increased frequency up to the age of forty, after which there is a diminution which I am inclined to believe would not persist if a larger number of cases were available for study.

In view of the fact that the duration of labor in the various groups gives little or no indication of the necessity for forceps delivery, an important point seems to be an increase in the number of perineal lacerations. This appears to indicate increased resistance of the pelvic floor, which is due mainly to rigidity of the muscles. With very few exceptions, and these equally distributed in the two groups, the os was fully dilated and the head well down in the pelvis before forceps were applied. Therefore it hardly seems likely that uterine inertia is, primarily, responsible for delay in the second stage. Inertia would presumably cause delay in all stages and it was only in the second stage that the delay was so frequently observed in these cases. This being taken in conjunction with the fact that increased

frequency of forceps application is associated with increased frequency of lacerations of the perineum, it seems reasonable to infer that the lack of distensibility of the perineum causes the necessity for forceps, even though the claim is made that it is the use of forceps that increases the frequency of lacerations and not the inherent rigidity of the muscles. The course of labor indicates resistance at the outlet, labor progressing normally until the head is on the perineum frequently even visible at the vulva, and then advance ceases or is so slow that the mother or child or both begin to evidence signs of distress. To explain these cases it is not reasonable to suppose that contraction of the outlet increases with age. The other two probable factors are inertia and rigidity of the perineum, both of which enter into it, but the latter, unquestionably, is the more important.

Myomata are distinctly a complication of advancing years. Consequently, as would be expected they are found, or at least recognized to be present, only in patients over thirty years of age. Only one of seven cases gave trouble, and it occasioned a transverse presentation, premature rupture of the membranes, prolapse of the cord and death of the child.

Eclampsia is a complication proportionately more frequent after thirty years, occurring once in every sixty cases. Before thirty it occurred once in every 177 cases. There were thirteen cases, altogether, with one death.

The occurrence of other abnormalities such as antepartum hemorrhage, postpartum hemorrhage, malpresentations, fetal abnormalities, etc., showed no particular predilection for any age period. The same is true of abnormalities of the third stage of labor, except that manual removal of the placenta was necessary three times in the older group (once for postpartum hemorrhage, and twice for adherent placenta), in the younger patients the placenta was removed manually once only, a marked difference in the percentage of occurrence.

Twins occurred with considerably greater frequency after the age of thirty, once in every forty-four labors, as compared to once in every 224 labors before thirty.

From these statistics, therefore, it appears that the only effects directly attributable to age are increase in the proportion of toxemias, increase in the frequency of twins, slight prolongation of labor, increased frequency of forceps application, greater rigidity of the perineum and, consequently, a greater proportion of lacerations, and greater frequency of adherent placenta. These three latter con-

ditions are responsible for a higher percentage of morbidity in the puerperium. One other point which, however, I have no figures to prove, is that elderly primiparæ seem to be less successful in nursing their babies, requiring a resort to supplementary feeding more frequently than do the younger women. Increased frequency of toxemias, delay in the second stage and the two cases of accidental hemorrhage are responsible for the higher death rate among the children born of the older patients.

There were two maternal deaths in this series of cases, one from acute streptococcus infection in the Rotunda Hospital, and one from eclampsia in the West Pennsylvania Hospital, both in patients under thirty years of age.

In conclusion I wish to thank the past master, Dr. Hastings Troudy, and the present master, Dr. Henry Jellett, for permission to use the records of the Rotunda Hospital.

STATISTICS AND SUMMARY.

	Fifteen to twenty-nine years	Thirty to forty-six years
Total cases	1570	242
Abortions and miscarriages.	17	4
Average duration of labor.	21 hours	$23\frac{2}{3}$ hours
Longest labor	110 hours	$99\frac{1}{2}$ hours
Shortest labor	$3\frac{1}{2}$ hours	$2\frac{3}{4}$ hours
Average third stage	33 minutes	32 minutes
Longest third stage	3 hours (expressed)	3 hours (Man. remov.)
Shortest third stage	Immed. deliv.	Immed. deliv.
Lacerated perineum	833 or $53\frac{1}{2}$ per cent. (1 complete)	174 or 72 per cent.
Failure of primary union.	29 or $3\frac{1}{2}$ per cent.	11 or $4\frac{1}{2}$ per cent.
Episiotomy (central tear)	2	0
Forceps	116 or $7\frac{1}{2}$ per cent.	68 or 29 per cent.
Version	3	3 (2 on 2d of twins, 1 on transverse with prolapse of cord)
Cesarean section for contracted pelvis	5	0
Extraperitoneal Cesarean for contracted pelvis.	5	0
Pubiotomy	4	2
Symphysiotomy	1	0
Craniotomy	1	1
Manual remov. of placenta.	1	3

STATISTICS AND SUMMARY.—(*Continued.*)

	Fifteen to twenty-nine years	Thirty to forty-six years
Total cases	1570	242 (1 P. P. H., 2 adherent)
Induction of labor	1	0
Twins	7	6
Breech presentation	40	4
Face presentation	6	0
Brow presentation	1	0
Transverse presentation	0	3 (2 second of twins)
P. O. P.	7	5
Contracted pelvis (9 cm. or less).	29	6
Prolapse of cord	2	1
Myomata (uterine)	0	7
Preeclamptic toxemia	1	1
Eclampsia	9	4
Pyelitis	0	1
Mitral stenosis (failure of compensation).	0	1
Accidental hemorrhage	0	2
Placenta previa	1	0
Postpartum hemorrhage	24	3
Hematoma of vulva	2	0
Parenchymatous mastitis	3	0
Puerperal mania	1	0
Stillbirths	52 (31 macerated, 21 recent)	20 (8 macerated, 12 recent)
Died in hospital (children).	29	12
Anencephalus	1	0
Hydrocephalus	1	0
Cleft palate	1	0
Spina bifida	1	0
Genu recurvatum	1	0
Talipes	3	0
Average weight children	$7\frac{1}{4}$ pounds	$7\frac{1}{5}$ pounds
Heaviest child	$9\frac{3}{4}$ pounds	$9\frac{3}{4}$ pounds
Lightest full-term child (not one of twins).	$4\frac{1}{8}$ pounds	$4\frac{1}{4}$ pounds
Mechanism third stage:		
Schultze	86 per cent.	86 per cent.
Matthews-Duncan	14 per cent.	14 per cent.

Fifteen to nineteen years.

Total	188 cases	Contracted pelvis	4
Abortions and miscarriages	8	Prolapse of the cord	1
Average duration of labor	19½ hours	Eclampsia	2
Longest labor	76½ hours	P. P. H.	1
Shortest labor	4 hours	Parenchymatous mastitis	1
Average duration of third stage	32½ minutes	Stillbirths	4 (2 recent, 2 macerated)
Longest third stage	95 minutes		
Shortest third stage	3 minutes	Died in hospital	2
Lacerated perineums	71–39½ per cent.	Average weight of children	7⅛ pounds
		Heaviest child	9 pounds
Failure of primary union	3 or 4¼ per cent.	Lightest full-term child	5 pounds (not one of twins)
Forceps	8 or 4½ per cent.	Mechanism of third stage:	
		Schultze	83 per cent.
Breech	4	Matthews-Duncan	17 per cent.
Cesarean section for contracted pelvis.	2		

Twenty to twenty-four years.

Total number of cases	871	Twins	3
Abortions and miscarriages	6	Breech	25
Average labor	20 hours	Face	4
Average third stage	33 minutes	P. O. P.	4
Shortest labor	3½ hours	P. P. H.	11
Longest labor	110 hours	Hematoma of vulva	1
Longest third stage	3 hours	Preeclamptic toxemia	1
Shortest third stage	Immediate delivery	Contracted pelvis (9 cm. or less).	12
Lacerated perineums	435 or 50 per cent.	Average weight of children	7½ pounds
		Heaviest child	9¾ pounds
Failure of primary union	12 or 2⅘ per cent.	Lightest child, full term, not one of twins.	4¾ pounds
Forceps	47 or 5½ per cent.	Stillbirths	28 (16 macerated, 12 recent)
Version	3		
Cesarean section for contracted pelvis	3	Died in hospital	20
		Anencephalus	1
Extraperitoneal Cesarean section for contracted pelvis.	3	Spina bifida	1
		Cleft palate	1
Manual removal of placenta.	1	Mechanism of third stage:	
Pubiotomy	2	Schultze	89½ per cent.
Symphysiotomy	1	Matthews-Duncan	10½ per cent.
Induction of labor	1	Maternal death from acute sepsis.	1
Episiotomy for central tear.	1		

Twenty-five to twenty-nine years.

Total cases	511	Brow	1
Abortions and miscarriages	3	P. O. P.	3
Average labor	23 hours	Twins	4
Longest labor	107½ hours	Contracted pelvis (9 cm. or less).	13
Shortest labor	3½ hours	Prolapse of the cord	1
Average third stage	33 minutes	Eclampsia	3
Longest third stage	2 hours, 40 minutes	P. P. H.	12
Shortest third stage	Immediate delivery	Hematoma of the vulva	1
		Parenchymatous mastitis	2
Lacerated perineums:		Puerperal mania	1
Incomplete	326	Stillbirths	20 (13 macerated, 7 recent)
Complete	1		
Total	327 or 64 per cent.	Died in hospital	7
		Average weight of children	7¼ pounds
Failure of primary union	14 or 4½ per cent.	Heaviest child	9½ pounds
		Lightest full-term child	4½ pounds (not one of twins)
Episiotomy for central tear	1		
Forceps	61 or 12 per cent.	Talipes	3
		Genu recurvatum	1
Extraperitoneal Cesarean section for contracted pelvis.	2	Hydrocephalus	1
		Mechanism of third stage:	
Pubiotomy	2	Schultze	87½ per cent.
Craniotomy	1	Matthews-Duncan	12½ per cent.
Breech	11		
Face	2		

Thirty to thirty-four years.

Total	173 cases	Twins	4
Abortions	3	Breech	4
Average labor	23½ hours	Transverse	1, second of twins
Average third stage	32¾ minutes		
Longest labor	96 hours	P. O. P.	4
Shortest labor	2¾ hours	Myoma	4
Longest third stage	3 hours, manual removal	P. P. H.	1
		Eclampsia	4
		Pyelitis	1
Shortest third stage	Immediate delivery	Mitral stenosis and failure of compensation.	1
Lacerated perineum	123–72½ per cent.	Stillbirths	8 (5 macerated, 3 recent)
Failure of primary union	8–6½ per cent.	Died in hospital	10
		Average weight of children	7¼ pounds
Forceps	49–28⅝ per cent.	Heaviest child	9¾ pounds
		Lightest full-term child	5 (not one of twins)
Version	1		
Manual removal of placenta	2	Mechanism of third stage:	
Pubiotomy	2	Schultze	84 per cent.
Contracted pelvis (9 cm. or less).	4	Matthews-Duncan	16 per cent.

Thirty-five to thirty-nine years.

Total cases	53	P. O. P.	1
Abortion	1	Antepartum hemorrhage	2
Miscarriages	2	Myoma	2
Average labor	25⅝ hours	P. P. H.	1
Average third stage	30 minutes	Stillbirths	7 (2 macerated, 5 fresh)
Longest labor	99½ hours		
Shortest labor	3½ hours		
Longest third stage	60 minutes	Died in hospital	2 (cerebral hemorrhage, congenital syphilis)
Shortest third stage	Immediate		
Lacerated perineum	41–82 per cent.		
Failure of primary union	3–7½ per cent.	Average weight of children	7½ pounds
		Heaviest child	9½ pounds
Forceps	15–30 per cent.	Lightest child (full-term)	4½ pounds (not one of twins)
Version	1, transverse and prolapsus funis	Mechanism of third stage:	
		Schultze	86 per cent.
Craniotomy	1	Matthews-Duncan	14 per cent.
Contracted pelvis (9 cm. or less).	2		

Forty to forty-six years.

Total cases	16	Transverse	1 second of twins
Average labor	19½ hours		
Average third stage	30 minutes (29)	Myoma	1
		P. P. H.	1
Longest labor	51½ hours	Preeclamptic toxemia	1
Shortest labor	6½ hours	Stillbirths	5 (1 macerated, 4 fresh, 2 twins in eclampsia and 2 cord around neck)
Longest third stage	75 minutes		
Shortest third stage	15 minutes		
Lacerated perineum	10–62½ per cent.		
Failure of primary union	0		
Forceps	4–25 per cent.	Average weight of children	6¾ pounds
		Heaviest child	8½ pounds
Version	1, on second of twins	Lightest child, full-term	5 pounds (not 1 of twins)
Manual removal of adherent placenta.	1, myoma and macerated child	Mechanism of third stage:	
		Schultze	88 per cent.
Twins	2	Matthews-Duncan	12 per cent.

DISCUSSION.

Dr. Hugo O. Pantzer, Indianapolis.—I wish to touch briefly on a few points having a fundamental bearing upon the subject so interestingly and fully presented by the essayist. The difficulty of lactation encountered in these cases no doubt often rests in the chronic toxemia, which by timely anticipation and treatment can be successfully met. The dread of childbirth which these women and

their doctors have no doubt is a forceful influence in bringing about disaster at the time of labor. I would look for no more than a protracted labor in most women bearing late, notably, when they have not suffered from excessive muscular occupations, or grave toxemias. With the proper assurance felt and expressed by the accoucheur, and proper time given nature, these women should do better in labor than is usually the result.

THE TREATMENT OF ABORTION ON THE BASIS OF ITS PATHOLOGY.

BY

CHANNING W. BARRETT, M. D.,

Professor of Gynecology and Clinical Gynecology, University of Illinois Medical School; Professor of Gynecology, Chicago Policlinic. Attending Gynecologist, Cook County Hospital, Henrotin and West Side Hospitals,

Chicago.

No small percentage of gynecologic cases, and at least a small percentage of neurologic cases, date their beginning from an abortion or a series of abortions.

A history of abortions means in most cases a history of infection. Endocervicitis, endometritis, subinvolution and adnexial disease are common. Sometimes, we must admit, the abortion is due to the previous although unrecognized pelvic disease; but more often, perhaps, the pelvic disease is the result of a produced or neglected abortion. The frequency of complications and sequelæ of abortion are to be accountedfor largely , first, by its etiology; that is, being produced, there is opportunity for trauma and infection; or, being spontaneous, we have the general or local disease which induced it. Second, its incompleteness, portions of the ovum remaining as a foreign body and a culture medium. Third, its uncertainty as to time of onset leading to unpreparedness. Fourth, the length of time it continues leading to neglect and opportunities for infection. Fifth, its criminality, the desire to cover, which leads to neglect and errors in treatment. Sixth, the continuance of household or other duties while the abortion is incomplete, or too early resumption of duties afterward.

No such percentage of evil results follows therapeutic abortions as does the criminal or spontaneous abortion. If one method of abortion takes a person in the pink of health and results in a high percentage of mortality or morbidity, and another method takes the patient with heart, kidney or lung lesion calling for a therapeutic abortion and results in almost universal good results locally and improvement in the lesions of other organs, it is well to study the methods of the latter procedure and apply them as nearly as possible to the treatment of the former. The therapeutic abortion differs from others largely in the care given the patient and its completeness; no such methods being used to start the abortion and then allowing

it to continue and become infected. At one sitting under surgical conditions, the uterus is dilated and completely emptied, after which good recovery is almost certain. It will be urged that therapeutic abortion has not the opportunity for infection that the criminal abortion has, but the opportunity for infection in criminal abortion is not alone in its inception, but also in its neglect. In spontaneous abortion the ones that are promptly complete are almost without mortality or incident if the patient is given a few days rest. The ones that are incomplete furnish the infections, the complications, the mortality and morbidity. In criminal abortions the above holds true to a large extent. In a study of 274 abortions by Titus, 162 were classed as incomplete, while thirty-five were counted complete; some being rated as "threatening," inevitable therapeutic, etc. Twelve of the thirty-five "complete" abortions had a temperature above 101°, but no case died in this class. Seventy-three of the 162 incomplete abortions were infected, with five deaths. Thus 6.58 per cent. of the infected cases in incomplete abortion, or 3.7 per cent. of all incomplete abortion died. Thirty-two of the forty-one criminal abortions ran a temperature above 101°. The remaining nine cases recovered, while five of the thirty-two infected cases died. Thus no death occurred in complete abortion or in noninfected abortion, and, therefore, incompleteness and infection run hand in hand in producing a mortality, and while no statistics are given as to morbidity we can reach no other reasonable conclusion than that a considerable morbidity was shown later.

Statistics differ widely as to the relative number of abortions, and it is likely that careful questioning of patients does not arrive at the whole truth. A large series of histories were studied for the purpose of determining this point, and it was found that about two out of every five pregnancies terminated before viability. As this proportion occupies a middle ground among other statistics, it may perhaps be considered fairly near the truth. Only a small percentage of abortions may be considered complete. Absolute completeness can only be determined at the time by exploration, and this test has scarcely ever failed to find placental débris. Only a small amount remaining adherent is sufficient, as has been demonstrated time after time, to keep up hemorrhage and result in a deciduitis and endometritis, metritis and subinvolution of long standing.

Four cases observed within the year were thought, by the apparent intactness of the ovum and cessation of the symptoms, to be complete and yet an exploration necessitated by continued hemorrhage and slight rise of temperature discovered a very small piece of

placental tissue in each case. A large number of cases seen at the County Hospital and a moderate number of private work contradict flatly the oft-repeated theory that the uterus may be counted upon to empty itself. The uterus and the ovum are unripe for separation, and almost invariably some portion remains. This may continue for some time without a severe infection taking place, but it leaves no doubt as to its tendency in that direction. The placental tissue as a foreign body serves to favor the development of any infection that may have been introduced, and also tends to make this the *locus minoris resistentia* for infection within the body. Not only this, but the continued or oft-repeated hemorrhages call for attention on the part of the patient that eventually lead to infection. There seems to be no comparison between a complete and incomplete abortion to develop infection, and little comparison in the two in their capacity for harm if infection has taken place. Almost the entire mortality of abortion come from infection, and yet no little morbidity is possible without any considerable infectious process.

The uterus being interrupted in its development involutes less readily than at term under the most favorable conditions of an abortion, but with retained portions of the ovum hemorrhages take place which result in anemia, and subinvolution and deciduitis are induced which may serve as the etiologic factor in a subsequent abortion.

This paper has been suggested by the fact that the treatment of abortion, like the treatment of appendicitis and extrauterine pregnancy, has its advocates of the let-a-lone policy. Formerly a small and decreasing number taught that the incomplete abortion should be left alone unless infection was present. Within the last few years there has been a wave of stand-by-and-see-what-occurs policy advocated even when infection has taken place. This must be viewed in the light of the pathology which is found to be,

1. Such pathologic conditions as furnish the etiologic factor in the abortion; as, for illustration, syphilis, tuberculosis, anemia, diabetis, displacements, tumors, endometritis deciduitis, etc.

2. Such pathologic conditions as are affected by the pregnancy; as, for instance, lung, kidney and heart lesions.

3. Such pathologic conditions as are coincident but which may be neither the cause nor the result of abortion, as pelvic floor lacerations, cystocele, hemorrhoids, etc.

4. The pathology of the abortion itself, which is as a rule incompleteness, and in a large percentage of cases infection. The infection may result from an unclean attempt at abortion or may occur

during the mismanagement of an incomplete abortion. Trauma of the uterus occasionally occurs. The varied pathologic picture is made up of a uterus struggling with a more or less attached foreign body partially alive, partially gangrenous, partially loosened, allowing hemorrhage to take place to the point of anemia, lowered resistance, and exhaustion. The uterus meanwhile squeezing and traumatizing the remains of the ovum, and the presence of the ovum keeping the lymphatics and vessels open, and this traumatizing and damaging process going on frequently in the presence of infection varying in virulence from saprophites to streptococci. This results in leukocytosis and infiltration and exudates in and around the uterus. Small or larger uterine vessels become plugged with thrombi. In spite of this protective process bacterial invasion takes place and septicemia and pyemia result, and localized processes of infection take place in adjacent or distant organs. The peritoneum, liver, heart, lungs, kidneys, joints and other organs and structures are involved. The usual lay treatment of a long-continued incomplete abortion favors the introduction of infection, and the continual unrest on the part on the uterus favors its introduction into the tissues of the host. The treatment, then, of abortion is suggested by its pathology:

1. As a prophylactic measure women of a child-bearing age should be kept as nearly as possible free from the pathologic conditions which cause abortion. Syphilis thoroughly treated, displacements corrected, deciduitis removed, etc.

2. Conditions threatening abortion should receive attention, such as the removal of an ovarian tumor, or sometimes a fibroid or an incarcerated retrodisplaced pregnant uterus restored to position, operatively or nonoperatively.

3. An occasional patient requiring a therapeutic abortion in the early months should be anesthetized in a manner that will best conserve her forces and the uterus should be completely emptied at one sitting. A patient whose health requires that they should not go to term should usually be rendered sterile at this or some future sitting.

4. Threatened abortion should be treated by rest and sedatives.

5. Inevitable abortion is in good condition only when the uterus is empty. Bleeding or not bleeding, working or at rest, infected or noninfected, we know of no condition that leaves the uterus in a more favorable condition by reason of a partial or complete ovum within its cavity. As the complete noninfected abortion is altogether more desirable than the incomplete, so to a greater extent is

the complete infected abortion less undesirable than the incomplete with the same kind of infection. We are told that saprophitic infection is all that works upon the ovum, but a greater fallacy could not exist. Many a retained placenta is attached enough to make it a culture medium for pathogenic bacteria without resistance to overcome them. Its removal will remove the source, a factor counted so important in acute and chronic processes at the present. Some are fond of saying that our present conception of immunity teaches that the immunizing forces are the greatest factors in overcoming infection. I would say that our present knowledge of bacterial invasion and body immunity teaches that sometimes the body conquers and sometimes the bacteria win, and the former is more apt to take place if the bacteria hosts are depleted at their source. Two important and rational questions may arise in connection with a case of badly behaving abortion: first, is there retained structure and, second will the removal of the same if present do damage to the protecting forces that more than offset the advantages to be gained by its removal? A considerable experience teaches me that the former can only be guessed by symptoms and verified by exploration, and that infection to any considerable extent and bleeding indicate that abortion is incomplete. To avoid damage to the protecting forces the uterus should be explored with the view of removing foreign material, and not with the idea of doing a curettage in acute cases. The finger and proper placenta forceps should be used largely in place of the curet and the wall of the uterus should be attacked as little as possible. In this way we have made the benefits outweigh the evils in a large series of cases. If one's method of emptying the uterus does not do this, he must decide whether he will change his method or leave the material for the uterus to carry on the struggle.

6. Lastly, at the time of a therapeutic abortion or the emptying of a noninfected abortion, certain vaginal repairs have occasionally been performed and rectal work has been done. A few days, or in infected cases a few weeks, after a completed abortion has frequently been chosen as a favorable time to correct a weak floor or replace a uterus.

The accidental fracture of a bow-leg may be made the first step toward correction of the deformity. The forced period of rest may be elected as the time to correct the condition which caused the abortion, or results in ill health. Such good results are obtained that I am convinced that this work will grow in the hands of one who gives it a fair trial. In conclusion I would say that,

1. Abortions show a high percentage of incompleteness.

2. Infection is frequent and causes a considerable mortality and high morbidity.

3. The mortality of infection in abortion is almost entirely in incomplete abortion.

4. An incomplete abortion should be rendered as nearly like a therapeutic abortion as possible by removing uterine contents without damage to the protecting uterine wall.

5. Contraction of the uterine body into a firm mass is to be encouraged.

6. At a safe time and before the patient leaves the hospital many pelvic conditions may be corrected to the advantage of the patient and future pregnancies.

DISCUSSION.

Dr. William H. Humiston, Cleveland, Ohio.—Mr. President: There are one or two points I wish to make in reference to abortion to aid in determining as to whether the uterus still contains the products of conception or some portions of it. In the great majority of cases it is easily determined, and when we cannot determine it we should explore and find out. *If the uterus remains enlarged and the os patulous* (whether there is irregular flowing or not) you will find the retained products of conception within the uterus.

Dr. Asa B. Davis, New York City.—We see a large number of abortions in the Lying-In Hospital services, both indoor and outdoor, and after treating these cases and watching them for a long period of years I think we are generally of the opinion that there is no such thing as complete abortions, at least, we do not find them. We cannot be sure until we have explored the uterus, and for that reason we generally adopt the routine treatment of cleaning out the uterus in every case of abortion that comes to us. I heartily approve of Dr. Barrett's ideas. In therapeutic abortion there is some difficulty in packing and dilating the cervix, I think it is much better to do an operation where a therapeutic abortion is indicated at one sitting, and it can be done quickly and safely and thoroughly, whereas if you pack and wait, the agony is carried over a number of days and the patient is subjected to unnecessary irritation and anxiety.

Dr. Charles L. Bonifield, Cincinnati.—I have enjoyed Dr. Barrett's paper very much. It is timely, and I quite agree with him that whenever there is abortion the uterus should be cleaned out. There are two points that I cannot absolutely agree with. The first one was about giving these patients ether. Ether in my opinion is one of the greatest stimulants on earth, and I never hesitate to give a patient ether who is suffering from sepsis or from hemorrhage.

The other remark made needs a little shading, so to speak, and that is, this is a good time to effect repairs. My experience has been that we cannot correct bad lacerations such as those through the sphincter or a vesico-vaginal fistula, at this time. We cannot do

that successfully until involution has taken place. The structures will not hold the stitches, and while we may be able to repair the minor things after abortion, I think it is a mistake to try to make these repairs that require expert work.

Dr. Abraham J. Rongy, New York City.—There are two types of incomplete abortion brought into the hospital service. One in which we find the cervix entirely closed, uterus contracted with the hemorrhage entirely stopped. In the other the uterus is soft, showing retained secundines. If we curet these former cases we undo what Nature has done. Those patients in which bleeding has ceased do not need to be curetted. On the other hand, in those cases having open cervix, the procedure will depend upon the period of pregnancy. I do not think it is wise to empty the uterus in one sitting in these cases of abortion, whether it be two months or four months. I have attempted once or twice to empty the uterus at three or four months and found myself in trouble. In cases of incomplete abortion before the eighth week I curet, but in cases that have gone beyond this period, I introduce a bougie or catheter and at the end of twenty-four hours the product of conception is expelled by the uterus. It is dangerous to empty a uterus at one sitting that is three or four months pregnant. It not only cannot be done safely but there is danger of perforating the uterus.

Dr. Barrett (closing).—My purpose in presenting this paper was largely from the fact that there have been a goodly number of men, and some of them rather prominent men, who in the last few years have advocated the leaving alone policy of abortion, unless the hemorrhage was so great that the contents of the uterus should be removed to stop it, no matter whether there was infection or not. A large series of cases has demonstrated that when a uterus is once emptied and can be made to contract, the opportunity for other infections to do harm is decidedly lessened, and these patients usually make a prompt and decided recovery.

In answering Dr. Bonifield's question I suppose that it is entirely permissible for the President to take a nap once in a while (laughter), and so will say the point that he questioned was covered in the paper.

As to the other point, he brought up the question of it being inadvisable to do this line of repair work after abortion. I do not think any one questions for a minute that I would stand up and advocate that line of treatment if stitches absolutely did cut out at that time, as he says. As a matter of fact, we have tried it in the Cook County Hospital where these patients come in great numbers, in all degrees of abortion, and some of the cases that are perfectly clean are attended to by immediate operation, doing a thorough perineal operation. Whether there is complete laceration or incomplete, there is no more favorable time for healing to take place than at that time. The only thing is the tissues are a little tender to work with, and a novice would find the flaps hard to deal with, but as far as good healing is concerned we will never have a time that will be better. In the cases that

come in with a temperature of 102–103°, we would not think of doing this immediately upon cleaning out, but after emptying the uterus we allow the temperature to subside, and then repair as these patients may never be in the hospital again. They would go on and suffer with their condition; they are working people, they do not like to give up to go to the hospital, and this is their opportunity for recovery. A very energetic assistant will get lots of these cases for operation, and they can be very much benefited by the repair work which they receive at that time.

Now, going back to the question of anesthesia, I would say it was in the cases where a therapeutic abortion was to be done for tuberculosis or a kidney lesion, that we do not like to subject the patient to complete anesthesia, because we have seen cases who have had complete ether anesthesia that went down very rapidly when they had tuberculosis.

As to the question of the patulousness of the os determining whether there is material in there or not, of course there is a tendency for the os to remain open when there is material in there, and we can determine that by palpation; but there are oftentimes great quantities of material in the uterus with the os perfectly contracted and it is very difficult to dilate it sometimes. I believe it would be dangerous to teach that all cases of acute abortion should be curetted. I believe it is rather dangerous to teach that any of them should be curetted, and so we advocate not curettage in these cases but the removal of the foreign material without curettage.

THE USE OF SCOPOLAMINE IN OBSTETRICS.

BY

A. J. RONGY, M. D.,

New York.

In May of this year we decided to investigate the use of scopolamine in obstetrics. We were at that time fully aware of the various reports emanating from the different clinics, both in this country and abroad, covering a period of the last twelve years.

Steinbuchel was the first to use scopolamine in obstetrics and in 1902 cited his experience in a series of twenty cases. This report prompted Krönig and Gauss to make further investigations in order that they might thoroughly study this subject. In 1906 Gauss published the results of his observations in 500 cases, in which he used a combination of scopolamine hydrobromide and morphine to induce a state of semi-consciousness during labor. This mental state he termed "Dämmerschlaf" (Twilight sleep). The studies of Gauss stimulated a general interest in the subject and very soon numerous articles from the various obstetric clinics appeared. Some, chief among whom were Krönig, Zweifel, Berute, Newell, etc., confirmed the work of Gauss, and credited to this method all that he claimed for it; others, especially Hocheisen, not only denied its efficacy, but even attributed to it elements of danger to both mother and child. Notwithstanding the adverse criticism brought forth, Krönig, Gauss and their co-workers at Freiburg adopted this proceedure as a routine form of treatment. In 1907 Gauss published a second article reporting 1000 cases and in the spring of this year an extensive study covering a series of 5000 cases.

Before taking up the physiological action of scopolamine and morphine it would not be amiss to touch upon the physiology of labor pains and our aim to modify or alleviate these by the use of drugs.

We must differentiate between objective pain, by which we understand, uterine contraction and subjective pain, that which is experienced by the mother. Any method which has for its object the elimination of subjective pain, must under no circumstances interfere with objective pain.

It is a well-known fact that the pain caused by uterine contraction does not affect all women alike. Every experienced obstetrician

has occasionally seen a patient in whom labor has progressed to a stage of complete dilatation without any physical evidence of pain. We must, therefore, conclude that the degree of subjective pain depends upon the sensitiveness of a given nervous system. It is equally well known that the degree of sensitiveness can be modified by the use of many therapeutic measures.

The central nervous system is the seat for the perception of pain. Impulses are conducted to and from it. The degree of pain depends both upon the ability of the cortex of the brain to receive and upon the nerve trunks to conduct. If by any method we are able to minimize either the perceptive power or the degree of conductivity, pain may be markedly diminished, or even entirely abolished.

From the above it may be seen that the progress of labor does not depend upon subjective pain and that this may be diminished or eliminated without interfering with the normal progress of labor. Labor essentially depends upon the degree of uterine contraction for its successful termination. The purpose and object of this method of treatment is primarily to obtain a mental state in the patient by which the receptive and perceptive powers are diminished without the complete loss of consciousness. Clinically this is best accomplished by the judicious use of the combination of scopolamine hydrobromide and morphine.

It is not my intention to discuss the various physiological manifestations produced by these drugs upon the central nervous system, for I feel certain that their effects are too well known to all. I shall only attempt to call attention to the effects produced by these agents in their relation to obstetrics.

The action of scopolamine is chiefly upon the central nervous system. It quiets the cerebrum and diminishes the perception of pain, without apparently influencing the contractility of the uterus. Labor, therefore, may progress uninterruptedly and the patient may not only fail to recollect these pains but may even be entirely unaware of them.

Clinically these cases may be divided into three distinct groups: (1) Those patients in whom we obtain both amnesia and analgesia, that is abolition of memory and diminution of pain; (2) patients in whom we obtain analgesia without amnesia; (3) cases which entirely fail to respond to this treatment.

In order to obtain the best possible results with this method, certain cardinal requisites must be strictly observed. It is absolutely necessary that the patient is so placed that she is free from all disturbances. A physician or nurse should be in constant attendance.

The effects of the drug should be carefully watched so that it is repeated at proper intervals. Light in the room should be so arranged that the patient is not disturbed by it. The fetal heart sound should be carefully studied. Solutions should be obtained from reliable chemists and should be accurately standardized. It should be perfectly clear, never having any sediment or flocculence, and should preferably be put up in ampules each containing the quantity required for a single injection.

In instituting this method of treatment, it has been my good fortune to obtain the services of Dr. K. Schlossingk who was one of the assistants in the clinic of Krönig at Freiburg.

For purposes of accurate statistics, special charts were printed, indicating the important points to be noted. Dr. Schlossingk assumed full charge, so that the technic followed by him was identical with that of Krönig and Gauss at Freiburg.

Our rule is to admit to the hospital only those patients who are in active labor. We, therefore, have no means of judging precisely when labor set in, and the average duration of the first stage.

Treatment is begun only when the patient shows definite signs of active labor. The patient is then put to bed in a dimly lighted room and an initial dose of 0.00045 gm. or approximately 1/160 grain of scopolamine hydrobromide is injected intramuscularly. This is preceded by a hypodermic injection of 1/2 grain of narkophen. The effects are now carefully observed with special reference to pulse, respiration, pupilary reaction, fetal heart sounds and frequency and intensity of uterine contractions. A second injection of scopolamine is given about one hour after the first one. About one-half an hour after this injection memory tests are brought into play. The patient is shown some object, such as a doll or watch, and a short while later she is asked whether she saw the particular object in question. She may be asked whether she remembers having received a hypodermic injection. Any test of memory will do. The repetition of injections is now primarily gauged by the degree of amnesia present. The interval between injections is approximately 1–1–1/2 hours. The average normal case requires from five to seven injections, although at times it may be necessary to give only two or three or as many as twelve or fourteen.

At the completion of the first stage, with the presenting part on the perineum, 1 c.c. of pituitrin is usually given to hasten delivery. As soon as the child is born, the cord is quickly ligated and severed and the infant is removed to another room. The mother is made comfortable and usually falls into a deep slumber to awake two to

four hours later often in complete ignorance of the fact that she has already given birth to her child.

When this treatment was first instituted, many difficulties were encountered. Being an experiment, with final results uncertain, we hesitated to inform our patients and therefore lacked their cooperation. Dr. Schlossingk was not quite familiar with our type of women, and consequently could not accurately gauge the dosage and intervals. For our solutions we had to depend upon a local chemist, who at best sent us preparations which quickly deteriorated. Our accommodations at that time were such that it was impossible to devote a special room to this work, the patients being treated on the regular delivery tables. As a result of these obstacles our results in the early cases were not too encouraging. We felt, however, that this method of treatment deserved a further trial. Arrangements were then made by which the treatment was carried out as near as possible to that described by Gauss at Freiburg. The percentage of successful cases immediately increased and it was now quite evident that this mode of treatment deserved all that Krönig and Gauss claimed for it.

Drugs.—The scopolamine used is that prepared by Hoffman, La Roche according to the method prescribed by Straub. This consists of the addition of mannite $C_6H_8(OH)_6$ to the scopolamine. This prevents deterioration of the solution, and therefore standardizes its physiological action.

Morphine and pantapon were used for a long time but their depressing effects upon the respiratory center, chiefly in the child, led Staub to construct a synthetic opiate which he called Narkophen (morphine-narcotine-menconat). This preparation seems to have the same sedative action as morphine without the depressant effect on the respiratory center. Narkophen is prepared by Böhringer Sohne of Mannheim.

Our experience with this form of treatment consists of a series of 125 consecutive cases in the obstetric services of the Jewish Maternity and Lebanon Hospitals. As previously stated, our cases were subdivided into three groups with the following results: (a) 104 cases or 83.2 per cent. in which there was complete amnesia with analgesia; (b) nine cases or 7.2 per cent. in which there was analgesia without amnesia; (c) twelve cases or 9.6 per cent. in which the treatment failed to produce the desired effects.

We shall now attempt to emphasize those phases connected with labor and the postpartum period which are of special interest to the obstetrician.

Pain.—Pain is less intense and apparently of a shorter duration,

for it is only the acme of the pain that the patient is probably conscious of. However, if closely observed, we find no alteration in the actual time of uterine contractions. Apparently the intervals between pains are lengthened, but in reality they are about the same. The outward manifestations of pain, such as facial expression and outcry are markedly diminished.

Duration of Labor.—Since our patients are admitted only when in active labor, we have no precise means of judging the duration of labor. The average duration of labor in primiparæ in this series, figuring from the time of admission to delivery, was eight and one-half hours. The average time that the patients were under the influence of scopolamine was about six and one-half hours. The longest period that a patient was kept under was nineteen hours. The shortest period was one and one-half hours. The average number of injections was five, the highest number was twelve, and the lowest, one.

Effects on Child.—One of the principal reasons advanced against this form of treatment was that many children were born asphyxiated with a resulting increase in the infant mortality.

We must distinguish between asphyxia and oligopnea, a condition which is often seen in babies delivered by this method. This condition is best explained by Gauss and Holtzbach. They believe it to be due to the fact that scopolamine depresses the peripheral filaments of the vagus (in intrauterine life) and when the child is born it requires a longer period to accumulate a sufficient quantity of carbon dioxide to stimulate the respiratory center in the medulla. Clinically this is illustrated by the fact that scopolamine babies, when born in a state of oligopnea, breathe and sometimes cry immediately after delivery; following this there is a drop in the heart rate and the breathing becomes exceedingly shallow, and within the succeeding five to ten minutes the child gradually resumes normal respiration and good heart action. That this condition is not dangerous is best proven by the fact that these children do best when not interfered with, by any artificial methods of resuscitation.

In our series 102 babies, or 81.6 per cent., cried spontaneously. There were nineteen cases or 15.2 per cent. in which there was varying degrees of oligopnea present. There were four cases or 3.2 per cent. of asphyxiated children. The total infant mortality was three deaths or 2.4 per cent. One was a premature infant with spina bifida. The second died from neanatorium and the third from subdural hemorrhage.

Operative Procedures.—In our series, labor had to be terminated artificially in fifteen cases or 12 per cent. In two patients the

breech presented and delivery was accomplished by bringing down a foot. In thirteen cases forceps was used; of these two were medium and eleven low. One case was nephritic with marked edema, and it was deemed advisable to terminate labor quickly. In three cases forceps was indicated because of persistent occipitoposterior positions. In one case labor was terminated because of an existing severe cardial condition. In three cases labor was prolonged, the fetal head apparently meeting with some obstruction at the pelvic outlet. In six cases labor was terminated on account of a tedious second stage. In the last-mentioned cases, the perineum was bulging with caput showing and practically all that was necessary was extension of the head with the forceps blades. The instruments were then removed and labor allowed to terminate spontaneously.

Anesthetics.—In the most recent report by Ziegel of Freiburg in a series of over 200 cases ethyl chloride by inoculation was administered as a routine during the stage of expulsion. This is done in order to further obviate any recollections of pain.

It has been found that in order to carry out this form of treatment successfully, the patient must be constantly kept under the influence of the drug. Should she at any time during the course of the treatment partially regain consciousness, she will not only recollect the pain which she actually experienced, but will reconstruct the entire progress of labor. Such isolated periods of relative consciousness are termed by Gauss "Isles of Memory." These are most apt to occur during the stage of expulsion. In our series we did not find it necessary to resort to the use of a general anesthetic for this purpose.

Ether was the anesthetic used where artificial delivery was performed. The use of chloroform for any purpose during labor was abandoned by us about three years ago. The patients were very quickly narcoticized, taking the ether very readily and consuming very small quantities of it.

Contraindications.—With the possible exception of kidney complications, we find no contraindications for the use of this method. Zweifel even goes so far as to recommend it in eclampsia and reports three cases treated successfully.

Endocarditis was present in two cases with no untoward effects as a result of this mode of treatment. On the contrary we believe that this procedure is especially efficacious in labors associated with cardiac disease, for it tends to eliminate not only the mental anxiety but the actual physical strain induced by the patient's efforts to help labor along.

Convalescence.—It is interesting to note how little these patients

are physically effected by labor. The exhaustion that usually accompanies labor in primiparæ is entirely eliminated. They usually appear very calm the following day, for instead of having passed the previous day in pain and wakefulness, they had gone through labor in a state of semi-consciousness without any undue physical exertion. There were ninety-two primiparæ in our series and in our experience this treatment is best suited to first labors.

We have also observed that the tendency toward engorgement of the breasts is notably diminished in these cases. This is probably due to the action of scopolamine on the peripheral secretory nerves.

Conclusions.—1. Standard solutions are absolutely essential for the success of this treatment.

2. No routine method of treatment should be adopted. Each patient should be individualized.

3. Facilities should be such that the patient is not unduly disturbed.

4. A nurse or physician must be in constant attendance.

5. This form of treatment is carried out in hospitals, although there is no reason why it cannot be accomplished in well-regulated private homes.

6. It does not affect the first stage of labor, but the second stage is somewhat prolonged.

7. Pain is markedly diminished in all cases, while amnesia is present in the greatest number of patients.

8. This treatment does not in any way interfere with any other therapeutic measures which may be deemed necessary for the termination of labor.

9. Fetal heart sounds must be carefully watched. Sudden slowing calls for immediate delivery when possible or the discontinuance of the treatment.

10. Oligopnea was present in 15.2 per cent. of cases. However, normal respiration was very soon established and no ill effects were observed.

11. No change in the course of the puerperium was observed and convalescence progressed very smoothly in our entire series.

Finally, judging from our observations and experience, we feel that this method of treatment should be given a fair trial. It is only a varied experience by competent men that will tend to settle this extremely interesting subject. It is the duty of the medical profession to set the public aright on this most important question. For our part we believe that this method of treatment robs the woman of the agonies of pain accompanying labor, and in addition

instills within her a feeling of confidence which materially aids her to pass through this trying ordeal. We must approach this subject both from a medical and humane aspect. If pain can be relieved it is every physician's duty to do so, and no effort should be spared to accomplish it. The comparative safety with which this drug may be used in competent hands, not only justifies but compels every obstetrician to give this form of treatment a fair test, and convince himself as to its merits.

To condemn or advocate a given therapeutic measure without a thorough personal investigation is truly unscientific and not in accordance with the tenets of progressive American medicine.

62 West Eighty-ninth Street.

SCOPOLAMINE-NARCOPHIN SEMINARCOSIS IN LABOR.

BY

JAMES A. HARRAR, M. D. AND ROSS MCPHERSON, M. D.,

New York.

UNDERTAKEN rather in a spirit of skepticism, the present investigation was begun by us several months ago. Doubtless many others have shared our recent experience in being the recipients of inquiries on account of sensational articles in the lay press on "painless childbirth." The first attitude was naturally to ridicule the whole matter as preposterous and to recall the agitation on the subject among obstetricians in 1907 and 1908, at which time the method was tried and found dangerous. Many foreign observers, notably Steffens(1), Leopold, Hocheisen(2) and Veit(3) opposed it. It was also used for a time by many men in this country; condemned by some, faintly praised by others, but eventually abandoned by all. Newell(4) of Boston reported favorably on 112 cases in 1907. He later gave it up on account of the asphyxiated babies. Scopolamine-morphine narcosis in labor was tried by McPherson in 1908 at the Lying-In Hospital in New York, but proved exceedingly dangerous to the babies and also failed to produce results as far as the mother was concerned.

A few months ago in the columns of a magazine with wide circulation among American women, four professors of obstetrics in four of the most prominent medical schools in this country publish statements over their names denouncing scopolamine-morphin in childbirth. They claim respectively that its use is uncertain, dangerous and unsatisfactory; that it does not abolish pain in the small amounts used; and that the impressions received and opinions formed by them are decidedly unfavorable to the treatment.

There is nothing new in the use of scopolamine in obstetrics. Von Steinbuchel(5) in 1902 first suggested that it would be of value. The technic was further elaborated by Gauss(6) in Krönig's clinic at Freiburg, and in 1906 he published his first 600 cases. In 1907 and 1908 the literature contains several articles by Gauss(7), Krönig(8) and Mansfeld(9), describing the administration of the method in all the details mentioned by Krönig in 1913. Notwithstanding the good results claimed, Steffens and Hocheisen wrote strongly opposing its use after trial in 300 cases, and Leopold and

Veit soon gave it up as dangerous. Frequent asphyxia and death of infants, with atonic postpartum hemorrhage and prolongation of labor, were the bad results reported. The final verdict was; first, the method did not accomplish the desired results, second, it could not be regarded as harmless for mother and child, and third, it was not to be recommended in private practice, as the by-effects liable to develop made it necessary that medical aid could be summoned at any moment.

Thus the subject had been dropped during the last six years by most obstetricians until last fall Krönig(10) again called the attention of the profession to its value. It is scarcely possible that the distinguished head of a reputable German clinic would presume to publish successful results of a method in over 3000 cases unless there was some virtue in it.

We are aware that an important factor in the increasingly difficult labors among more highly civilized and cultivated modern women is that they have not the strength to resist the nervous exhaustion caused by the appreciation of continued labor pains. To be sure it is possible by the administration of small amounts of ether, chloroform, or nitrous oxide, to make the actual delivery of the child practically painless. But the difficulty with such narcotics is that they cannot be given over a sufficient length of time to relieve the nervous exhaustion of labor without largely inhibiting its efficiency. Hence it seems justifiable to make another trial of the method in a series of cases, following more closely the technic of Krönig(11) and Gauss, provided there is no repetition of our previous bad results. We desire to see if we can secure anything like the results claimed by Krönig in Chicago last November. The question arises, can scopolamine when given in nonpoisonous doses have action adequate to produce appreciable relief in labor pains. It was entirely with an open mind that we approached the experiment, wishing to ascertain to our own satisfaction to just what extent we could condemn or extol the merits of the treatment. A phenomenon as interesting as the twilight sleep itself is that detailed descriptions of the technic such as have been followed closely in this study have lain idle in the literature for six years with no one taking advantage of them. Those who did make a trial of the procedure wandered far afield both in method and in the object to be obtained.

The crux of the proposition seemed to lie in three errors. First, most men in this country at least used a combination of the two drugs, scopolamine and morphine, not only for the initial dose, but for the succeeding doses as well; second, the bad results were due

also to excessive dosage, and to the use of unstable and deteriorated preparations of the scopolamine; and third, the erroneous notion prevailed that the method was to abolish the sufferings of labor, whereas it is intended only to prevent memory of the event.

The technic recommended by Krönig(10) and Gauss, and followed by us in the present series of cases is as follows. The treatment is not started until the pains are occurring regularly, every four to five minutes, and lasting at least thirty seconds, as determined by laying the hand on the fundus and noting its contractions. The outcry of the patient is no guide to the strength of her pains. Waiting for labor to be well established thus at once eliminates cases of so-called primary inertia from treatment. The first injection consists of 0.00045 (1/150 gr.) of scopolamine hydrobromide combined with 0.03 (1/2 gr.) of narcophin. Narcophin is a proprietary preparation of narcotine-morphine meconate, and according to Krönig gives better results than morphine and is less toxic. We have used both and find no marked difference in the result, but in order to follow the technic in detail we are using the narcophin. It is sold in this country in ampoules, ready for hypodermic use, and also in bulk. In the latter form it must be made up into tablets for use. Scopolamine doubtless varies greatly in its purity and therapeutic action. We used several preparations, and were finally fortunate to secure a supply of the "Scopolamine, Haltbar" prepared in sterile ampoules after the formula of Straub of the Freiburg clinic. Its advantage lies in the fact that it is a stable solution and carefully standardized. Three-quarters of an hour after the first injection a second injection is given consisting of 0.00045 (1/150 gr.) scopolamine alone. Thus far the dosage is empirical and standard. The further dosage varies for each patient, and depends entirely upon repeated tests of memory.

Besides its slight analgesic action in combination with small doses of narcophen, scopolamine has the peculiar quality of producing prolonged interruptions in the mental associations. Based upon this action the psycological test of the patient's memory is the most accurate guide to the dosage required in a particular case. Some women require much less than others. It is quite simple to keep repeating very small doses of scopolamine and get results as to complete amnesia. But herein lie the dangers of the method, asphyxia of the child, prolonged labor, and atonic relaxation of the uterus. It is most important to secure amnesia with the minimal dose for each case. At Freiburg they have proved to their satisfaction that the quantity given must be regulated by the memory test, and Gauss

C. N. Case No.

SCOPOLAMINE AMNESIA. Division,

Name: Date,

HOUR:								
INJECTIONS: drug amount make								
CERVIX:								
MEMBRANES:								
UTERINE CONTRACTIONS: a. frequency b. length c. strength d. onset bearing-down pains								
SUBJECTIVE SYMPTOMS: whether fatigue, thirst, nausea, pain in sacrum? in abdomen? in perineum?								
OBJECTIVE SYMPTOMS: sleep between pains, during pains, flushing, vomiting, twitching of hands, outcry, mental confusion, delirium.								
MEMORY OF OBJECTS: Retained or Lost.								
FETAL HEART: **MATERNAL PULSE:**								
DELIVERY: method anesthetic								
CONDITION OF BABY AT BIRTH **PERINEUM:** **HEMORRHAGE:**								

insists that the success of the treatment stands or falls by the observations of this one test. Half an hour after the second dose the woman is asked whether she has had an injection, how many, and where; or if she remembers a watch, or some simple object that was shown her at that time. A note is made of her answer. Even if the memory is retained no new dose is given, but twice more at intervals of half an hour her memory is tested again. If the memory is still retained, a third injection of scopolamine, 0.0003 or less, is given. The third dose thus usually comes an hour and a half after the second. Further injections are given depending upon whether the memory is retained, dubious or lost. Abolition of memory is the result desired. It requires the nicest judgment to suit the test to the standard of the intelligence of a given case, especially in patients of the lower grades of mentality.

Frequent observations of the uterine contractions, the subjective and objective symptoms of the woman, the condition of the memory, the fetal and maternal heart rate, are noted and recorded on a suitable chart.

The patient is drowsy and sleeps lightly between her pains. When a pain occurs she manifests her suffering to a greater or less degree and again dozes. But consciousness is not entirely lost. She responds somewhat tardily to questions, and usually obeys commands as to change in posture or to an increase in her bearing-down efforts. The progress of labor must be more closely watched than usual, for the presenting part frequently is bulging the perineum without any increase in the apparent effort of the patient. This might be considered a disadvantage by those who are accustomed to judge of the advance by listening to the outcry of the patient from an adjoining room. The straining efforts as the head distends the vulva are not nervously augmented as in an entirely conscious patient. We have noted especially a more perfect mechanism and more regularly gradual escape of the head over the perineum, as attested by a distinct diminution of perineal lacerations. Whether this is the result of more perfect relaxation of the levator ani, or due to less tendency to reflex spasm thereof, remains to be proved.

Krönig lays great stress upon maintaining a condition of semi-unconsciousness, wherein the pains though apparently perceived are nevertheless immediately forgotten. The patient perceives a pain but does not apperceive it, in other words she does not appreciate it. At any rate on awakening she has no recollection of anything that has occurred. The patient may complain that the treatment is not

working and roundly abuse those in charge, yet half an hour after the birth have absolutely no recollection of her pains or of the coming of her baby even in cases in which no anesthetic is given. We find it a distinct advantage, however, to administer a few whiffs of chloroform or ether as the head escapes over the perineum. It is possible that this last pain may be so acute as to remain fixed in the patient's attention, and the whole treatment fail. One patient saw the accoucheur's hand covered with blood as he examined the placenta, and this was the only feature of her entire labor that remained fixed in her mind. It is important to reduce the sensory impressions as much as possible, hence isolation of the patient is necessary, the room is darkened and loud noises of any kind are avoided. Under disquieting conditions scopolamine induces excitement in the patient. At the time of actual birth the woman's face is kept covered, and the assistant occludes the patient's ears, or the cries of the child are muffled by the sound of running water. Thirty minutes after the birth of the child the woman is asked whether she has been delivered, and in the majority of cases she has actually no remembrance of the birth process and hesitates to believe that the child is actually hers.

The entire service of the Hospital is being utilized at present, and we are trying the method chiefly in primiparæ. Very early we found it necessary to select our cases, and it is perhaps in less than a quarter of all confinements at the Hospital that we are able to use it. Gauss was able to use the method in 70 per cent. of all cases, but a majority of our admissions come in so far advanced in labor that it is too late to start the treatment. We have found it impossible to get the patient under control of the drug after the onset of bearing down pains, and at present we are only using it in cases in which we anticipate a normal labor. We have to report our results in the first 100 cases, and for purposes of general comparison present brief statistics of the labors of an additional consecutive 100 primiparæ in which the scopolamine was not used. Krönig claims complete amnesia covering the duration of labor in 80 per cent. of cases. In our very limited experience in 100 cases we have secured complete amnesia in sixty-six women; and partial amnesia, hazy recollection with distinct alleviation of the patient's suffering in ten. Of the remaining twenty-four, twenty did not respond to the drug at all, and four were too far advanced in labor to derive any benefit. It is noteworthy that practically all of the successful cases were those in which the treatment was started three to seven hours before the terminations of labor. The percentage

of successful cases is increasing as we become more familiar with details of the treatment.

A study of the failures is of interest. In several the treatment was started too early. Labor had been in progress some hours but the uterine contractions were not sufficiently frequent or regular. Inertia developing, the treatment had to be abandoned. In some the second dose was given at too long an interval after the first. The majority of failures, however, were cases apparently quite suitable for the treatment, but though they dozed between pains, retained their memory perfectly throughout the duration of labor. In the majority of failures the maternal pulse did not go above 100 even with prolonged and excessive medication. One patient had 7/100 gr. of scopolamine during thirteen hours. She seemed to respond to the drug in every way, yet maintained her apperception of pain perfectly and the memory was retained at every test. If after three or four injections, amnesia is not obtained it is better perhaps not to push the treatment any further. In the majority of successes the maternal pulse rate was consistently elevated, and ranged between 100 and 130 when the patient was well under the influence of the scopolamine and full amnesia had been obtained. One patient developed a rapid weak pulse running between 140 and 160 for two hours after delivery, with active delirium, but with quiet and regular respiration. She was one of the successful cases and remembered absolutely nothing after the first injection. There is usually recollection of the pains that occurred before the treatment was started.

Involution of the uterus as observed by daily measurements of the height of the fundus proceeded normally. Many of the more intelligent patients expressed themselves as not feeling any more exhausted the day following than the day before the baby came, and several private patients who had previously read descriptions of the work at Freiburg were eager to get out of bed the first day. But we saw no reason to curtail the routine length of the lying-in period.

The disadvantages claimed by those opposing the treatment are chiefly two, fetal asphyxia and postpartum hemorrhage. It is evident that these objections are the result of improper technic. Our observations in 100 cases on these points are as follows: In the 100 primiparæ delivered without the use of scopolamine there were two instances of postpartum hemorrhage so profuse as to require packing, and moderate hemorrhage thirteen times. In our scopolamine cases there were two instances of rather severe hemorrhage, controlled without packing, and eight cases of moderate bleeding.

In other words the tendency to hemorrhage seems to be less, rather than greater. The two severe hemorrhages we encountered were cases in which pituitrin had been given more than an hour before delivery and were probably due to the atony from the wearing off of the effect of the pituitrin, as has been observed by Madill and Allan of the Rotunda Hospital.

As to the occurrence of fetal asphyxia; in the hundred delivered without scopolamine there were seven instances of asphyxia at birth, two of them requiring tubes and artificial respiration for twenty minutes. In the scopolamine babies the majority cried at once without any evidence of being under the influence of a drug, eight were moderately apneic, but responded promptly to flagellation and tubs, and two required artificial respiration for fifteen and twenty minutes. The asphyxia that occurred was in those cases where there was delay of the head on the perineum. Under the old technic the frequent severe fetal asphyxia was plainly due to the repeated doses of morphine. At present the initial dose of narcophin is well worn off before the baby is born. In rare instances with extreme restlessness of the mother it may be necessary to repeat the narcophin once in a very small dose. It is important not to do this in cases where delivery may be expected within two hours. There was one stillbirth in the untreated hundred and one baby that died in the first twenty-four hours. In the scopolamine series there were two stillbirths, and one death of a child of an eclamptic, twenty-four hours after birth apparently of a toxemia similar to its mother's.

One of the stillbirths occurred after forceps delivery on account of delay at the outlet for two hours with the cord around the neck, and one with an abnormally short cord tight around the neck. In both of these cases the fetal heart was heard distinctly and unchanged in rate twenty minutes before delivery. We feel these stillbirths were due rather to a faulty mechanism of labor and would have occurred the same without the administration of the scopolamine.

The average duration of labor in these hundred primiparæ was sixteen hours, as against eighteen hours in the untreated hundred. The third stage averaged thirteen minutes as against sixteen minutes in the untreated hundred. Hence there was no prolongation of labor. The average duration of labor after the first injection was six hours. In general, the effect on the course of labor was a rather more rapid dilatation of the cervix than usual, followed by a delay in the advance of the presenting part at the outlet and especially on the perineum. This constant delay on the perineum was rather disconcerting at first and resulted in an increase in the number of low forceps extractions

until we began to use pituitrin, which obviated the use of forceps in most of our later cases. In all there were seventeen forceps extractions, as compared with eleven in the untreated hundred primiparæ. Eight of these seventeen operations were done for arrest of the head at the outlet with strong pains, and would have been required in any case. Two low median forceps were done because of the fetal heart falling below 100. One of these babies was moderately asphyxiated at birth but promptly revived. Six were done for inertia with head at the outlet, and we would avoid these now with the use of pituitrin. One low forceps was done because of an intrapartum eclamptic seizure of the mother with the head on the perineum. As mentioned previously the perineal lacerations were greatly reduced in number owing to the slow escape of the head through the vulva. To this extent inertia with the head on the perineum may be said to be an advantage. There were forty-seven lacerated perineums in the untreated hundred primiparæ and thirty-six in the hundred primiparæ delivered under scopolamine semi-narcosis.

It thus appears that the few disadvantages of the treatment are ones that may be avoided by constant observation of the case. We count the fetal heart every fifteen minutes. The administration of the scopolamine and the memory test must be carried out with watch in hand and all the details of Krönig(10) and Gauss followed methodically to obtain the greatest number of successful amnesias.

Naturally the obstetrical side of the case is followed and managed exactly as though no scopolamine narcosis were being employed. Even closer attention than usual must be paid to the progress of labor and abnormalities promptly corrected as they arise.

And now as to the limitations of the treatment. In the ward service of a large hospital it is only in a fraction of the total admissions that the scopolamine semi-narcosis is feasible. The patients many times come in too far advanced in labor and often the resident staff are too busy to give the case the prolonged personal attention that is necessary.

On the other hand it is not only to be admitted but to be emphasized that the method is only a practical procedure for general practice in private houses when the finances of the patient permit the transfer of a complete working force to her room for the entire duration of labor. We tried eight cases in the tenement service with six successes, but the services of one or two attendants were constantly required throughout the course of labor and the remainder of the family was locked out.

We feel assured, however, that we have in this a valuable method

of abolishing the woman's recollection of the ordeal of labor in from 60 to 70 per cent. of cases; and we believe in conscientious and painstaking hands, by strictly adhering to the above described technic, that the possible dangers may be foreseen and avoided.

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DISCUSSION ON THE PAPERS OF DRS. RONGY AND HARRAR.

Dr. Ross McPherson, New York City.—I am not going to discuss the papers because I am naturally in accord with both of them, and there is nothing which I can add to either paper as regards the methods employed. What I do wish to do is, in the first place, to tell you about one case and show you how the method worked and then to make one or two remarks which have come to my mind since this subject was brought up.

I had a few weeks ago a private case in which Dr. Harrar was associated with me and which he will recall. This patient from the beginning of pregnancy took the ground that the whole process of pregnancy and labor was entirely erroneous; that the Creator was at fault in devising such a process, and the whole performance was absolutely impossible. She never ceased at any time to tell me this whenever I saw her, and when she finally went into labor at ten o'clock in the evening demanded a Cesarean section as soon as I arrived at the hospital. I asked her why and she replied, "Because it is an easy way to get out of it." There was no earthly indication for a Cesarean section, and I told her that I would not do it, whereupon she demanded "twilight sleep," and I decided to try it on her. She was a primipara, aged forty-two. Her pains started at ten o'clock in the evening and during the hours from ten to twelve, while waiting for the uterine contractions to make sufficient headway, I passed two of the most unhappy hours of my life, the

patient not ceasing to berate me during the whole two hours. At twelve o'clock I started with the first injection, an hour later I gave her the second, and as I recall it, she received four injections in all. At the end of that time her memory test was positive although she still continued to appreciate the pains as far as one could determine, slumbering lightly between them, but as soon as the pain reached its height, she would look up and say very unpleasant things, using language that I would not dare to mention in polite circles. I had promised to relieve her of these pains and expected to succeed in so doing, but I received so much abuse from her that I felt that she must be conscious and I was utterly disgusted with the treatment and said to myself it was no good. (Laughter.) With the knowledge that I had succeeded with this method in other patients I came to the conclusion that in this case it was a mistake. However, she had her baby at half past six in the morning, was all right, everything went along nicely, and she went to sleep. Imagine my extreme surprise when I went to her room at half past eight, and was greeted most graciously by the patient who said: "That was the most wonderful thing in the world." She is a very intelligent woman and she claims that she has no recollection of anything that took place in any way, shape, or manner after the first injection. She is perfectly happy and well satisfied with the treatment. That is one type of case we have seen which you will agree with me is rather striking.

Dr. Harrar has told you that in 1908 I used this method to try and produce the same result, and only had success in the first case out of a number. Several of the others had badly asphyxiated babies. We now know that we tried it in a more or less half-hearted and unskillful way. Morphin was given in large doses and we did not try any of the stage setting which is apparently very important.

It has taken the public press to wake up the medical profession, and it is not the first time they have done it. It is very unfortunate that it *has* taken the public press to awaken the medical profession to something which has been going on for six years, and now, as long as it has reached this point, it is up to an association like this not to let it get away any further. It is time for us to realize that we have been fooled and to make a direct move to neutralize that impression on the lay public. The public press, such as McClure's Magazine, the Woman's World, The Ladies Home Journal, and especially the Brooklyn Eagle, have published a lot of stuff that is not true.

I saw a few moments ago a picture of a beautiful little baby born in the good old way six years ago, and on the other side was another baby of the same mother born by the scopolamin method four years ago, and the child born under the scopolamin was 11/2 or 2 inches taller than the other. (Laughter.) Therefore, the scopolamin did it. It is unfortunate that we are obliged to listen to and have published statements manifestly so ridiculous as this, but the public do not care particularly whether it is true or not; they are interested in getting rid of pain, and if we have something that we can use properly to get rid of that

pain, it is better for us to use it skillfully than for every quack in the city and every man who has had no particular obstetrical experience to use it and thereby get us and everybody else into trouble. It is up to us to do the work and do it right, and tell the people who come under our care what they and we can expect. Women are demanding the use of scopolamin-morphin narcosis, and when they demand something they usually get it. They demanded the vote and they got it. They have not got it all over the country, but it looks as though they would. They are going to have scopolamin-morphin narcosis. They cannot go to Freiburg just now, and some of us are satisfied with this state of affairs.

In conclusion, I want to read a little article which was handed to me by my friend Dr. Dickinson at luncheon. It is an editorial which contains a good deal of truth.

The editorial reads: "In the October McClure's there is another article on the so-called "Dämmerschlaf," or "twilight sleep," the form of scopolamin anesthesia which that magazine first brought to the attention of the American public with the claim that, without dangers of any sort to either mother or child, it abolished all the tortures of maternity. Whether rightly or wrongly, this article will seem to many of its readers a truly terrible arraignment of the medical profession, perhaps the most terrible brought against it since Holmes in this country and Semmelweis in Austria accused its members—justly, as was soon proved—of leaving behind them what was described as "A swathe of dead women," to whom they carried, not health and healing, but a deadly infection. The present charge is not quite as serious as that one, but by clear implication it does go to the length of declaring that the doctors, had they thought less of their own convenience and interests and more of sparing women pain always agonizing and perils often fatal, could long since have freed childbirth of its terror and lifted the "primal curse."

"These statements, of course, will be hotly resented and promptly denied, but it is true that the condemnations of the Freiburg method that have come from many eminent and reputable practitioners of medicine will have little or no weight until those making them have used scopolamin exactly as it is used at the Frauenklinik. That it has failed in different dosages and conditions, no matter how often or in whose hands, is a fact without the slighest relevance to the questions at issue.

"And there is about the Freiburg treatment no trace or sign of the concealment which is the invariable mark of quackery. Every detail of the process has been frankly disclosed, and there is no pretension that what is done in Freiburg cannot be done as well anywhere else by any competent obstetrician who will avail himself of information freely offered to the whole profession. *Only those who have done so have the slightest right to criticise the "Dämmerschlaf," and it is not creditable to medicine that many others have ventured to denounce scopolamin anesthesia for no better than the very bad reason that they have themselves used the drug without good results or with discouraging ones.*"

Dr. K. Schlosingk, New York City.—I shall not discuss the two papers which have been read by Dr. Rongy and Dr. Harrar because I fully agree with them.

I am very glad to have the opportunity of speaking before this Association because when I came to America I found there was a good deal of adverse criticism directed against the Freiburg method. I found also that the reputation of Krönig had been attacked by some men in this country, and I felt it was my duty to show that many of the failures reported to get satisfactory results were not due to the Freiburg method itself, but due to faulty technic. I tried to get an opportunity to demonstrate this method on cases in America, and Dr. Rongy was kind enough to give it to me as he had seen some of the results obtained in Freiburg. When we have had more experience in giving so-called twilight anesthesia, which is a bad term to use, I am sure we will get as good results in the course of a few years as they are obtaining in Freiburg.

I want to speak of two points. One is so-called restlessness or violence on the part of the patient under scopolamin narcosis. This restlessness is due to the fact that she does not get a proper dose of the drug, and it is not due to irritation of the cerebrum, as some who are opposed to this form of narcosis claim. It is due to the fact that these patients are in a state of incoordination. They do not know exactly what they feel. They are uneasy, they move around in bed and do not know exactly what is going to happen. The best proof of that is, if you give a patient pituitrin and the number of pains and strength the of them increase, they get more. Pituitrin has no effect on the cerebrum.

Another point I wish to speak about is with reference to the technic used by Frederick Ziegel in a report published in the *Deutsche Medicinische Wochenschrift* for May of this year. Two hundred and twenty cases are reported in which the method employed is largely mechanical. We cannot rely absolutely on the memory test. For the memory test you need a special amount of intelligence, and not every woman has this intelligence, and scopolamin is used in a mere mechanical way in such cases. At Freiburg they do not rely on the memory test any more, but they rely more on the reflexes and coordination tests. The drug is now given in this way: They start with 45 decigrams or 1/170 of a grain of scopolamin and 3 centigrams of narcophen. Within three-quarters of an hour later they give the same dose of scopolamin, but no more narcophen. They repeat the scopolamin every three-quarters of an hour, and give narcophen and repeat it until the woman is delivered.

Personally, I was astonished when I saw that because I thought it was against the ideas of the Freiburg clinic to abrogate anesthesia. I was also surprised when they gave such powerful doses in such a short time.

I have treated two cases by the new method in the Maternity Hospital in New York with success, but had two or three failures from the old method, consequently I am not using the latter method any more.

It has been claimed by some of those who are opposed to this method of delivery that there is no sense in bringing on anesthesia with the object of only abolishing pain; that if a woman has actual pain, she naturally forgets it later, and that there is no sense in giving her an anesthetic at all.

Those who have seen one case of "twilight sleep" and have noticed how bright and fresh the woman feels after she has given birth to her baby with scopolamin anesthesia will admit that it is a great thing in abolishing shock.

Dr. Francis C. Goldsborough, Buffalo.—I did not expect to be called upon to say anything on this subject. I am glad to have heard these two papers, and since I am on my feet I will say a word or two. In 1907 I was in the Freiburg clinic and saw the method used. I was not very favorably impressed with it. It struck me that the asphyxia in the infant was quite marked in the few cases I saw, and when I returned to Baltimore, where I was living at that time, we tried it in a few cases at the hospital. We followed as accurately as we could the technic described by Krönig and Gauss, and we were disappointed in it. We found it was too dangerous. In two cases we had to do forceps operation rather rapidly to save the lives of the children because they became so asphyxiated. In one other case, where there was spontaneous delivery, the child was deeply asphyxiated. After trying it in a certain number of cases—I forget how many—we felt it was too dangerous a method and gave it up. I still feel somewhat skeptical about it.

We all deplore the great publicity the method has been given in the lay press, because, as Dr. Harrar has said, in only one-fourth of the cases that came to the clinic was the method used. That is a point the lay press does not emphasize but rather overlooks, so that most of our patients feel that this is a thing we are not using because it does not make much difference to us whether they suffer or not. The attitude of the medical profession is very different from that. Those of us who are not using the method after giving it a short trial, have not done so because we thought it was too dangerous. These papers encourage me to give the method a further trial, and whether or not I will be convinced after another trial that the method possesses all that is claimed for it, it is rather difficult to say.

Dr. Peter W. van Peyma, Buffalo.—I appreciate the honor of being asked to say something on this subject. We used this method at the General Hospital in years gone by, but not of course in accordance with the method employed lately, so that we gave it up.

Dr. Hugo O. Pantzer, Indianapolis, Indiana.—I have been highly pleased with the presentation of this subject. It is timely, not to say imperative, that expression come from this association at this juncture.

I have done only operative midwifery of late years, and have no experience with this method of delivery. I give the H. M. C. full strength tablet two hours before operation. This dose is repeated one-half hour before operation, if the patient has shown

no evidences of hyoscine idiosyncrasy by the first dose. I had chloroform given as the complement anesthesia until the *Journal of the American Medical Association* made its violent and unqualified attack upon chloroform.

I still hold that chloroform is the better complement anesthetic, better than ether, but give the latter, and not the former, on account of the psychic effect had upon patients by the militant denunciation of chloroform. A few drops of chloroform given to a patient at a time when there is struggling is commonly all sufficient. The entire quantity of chloroform required in these cases is commonly very small. I have given as little as sixty drops by actual count, in a hysterectomy with complications, etc. I have seen no bad effects from chloroform given in this combination. I am much pleased to hear one of the speakers say that he employs chloroform in combination with scopolamin.

Dr. Francis Reder, St. Louis, Missouri.—Both of these papers have been admirably presented. I may be censured for the opinion I entertain in regard to this procedure, but when we reflect that we are dealing with a perfectly healthy individual, and an organ engaged in a purely physiological function, where no untoward results are to be expected and where we feel reasonably certain that neither mother nor child will receive any serious injury, I fail to see the necessity of instituting such a measure in a normal labor and attempt to bridge the parturient woman over this physiological process in a semi-conscious condition. It is apparent that the emotion and sentiment attendant on the birth of a baby has about lost its appreciation. The significance attached to the joy of a mother upon hearing the first cry of her babe is as much as lost. Babies are now born preferably in hospitals than in homes. In this there is a decided advantage because it harbors the greatest measure of safety. If I understand correctly from these papers, the first stage of labor is usually allowed to go unassisted, that is, during one of the most trying stages of labor nothing is being done to relieve pain. The scopolamin is given in the second stage, the stage of expulsion, and great stress is laid upon the woman's state of mind. I cannot help but say that if a parturient woman in the second stage and under special instructions from her physician attends to business, she has very little time to think. It is only when the head is about to descend upon the perineum that an opiate sometimes becomes necessary for the relief of pain. At the stage of advancement morphia can be administered without imperiling the life of the child. For the first stage chloral hydrate, given in from forty to sixty grains per rectum, will often carry the parturient woman comfortably into the second stage. With all feeling for a suffering woman, I want to say that I am not in harmony with the policy which has been so enthusiastically advocated.

Dr. Arthur Holbrook Bill, Cleveland, Ohio.—I cannot agree with the last speaker that we are not called upon to try to relieve a woman of pain in labor simply because it is a physiological process.

There is no question in my mind but that the wear and tear of labor has a bad effect upon certain women with extremely delicate nervous sensibilities. I think it is a desirable thing to try to relieve the pain incident to labor in every way that is possible. I have felt this way and in my practice have, as far as my conscience would allow me, administered drugs which would relieve pain. I confess that I have given hypodermics of scopolamin and morphin in a half-hearted way during the last year or two. I have continued to use them more or less, but almost always with fear and trembling. There is no doubt that the administration of scopolamin and morphin anesthesia will do everything that has been claimed for it. It will, to be sure, relieve the sufferings of women who are in labor. There is one thing which has kept me from using it as a routine measure in the last few years, and that is the fear of the danger to the child which has been constantly in my mind. If there is any one thing that worries the conscientious obstetrician during a labor, if there is any one thing that is uppermost in his mind, it is the question of the baby. We listen to the fetal heart, we are constantly watching for any signs of danger to the baby, and we are ready to deliver if there are such signs. I have seen beautiful results from the administration of these drugs, given for the most part, not according to the technic of Krönig and Gauss, but according to the old dosage which we were accustomed to use five or six years ago. But I have seen babies born with delayed respiration and have been much frightened at their appearance and with the difficulty of resuscitating them, but with one or two possible exceptions, I cannot say that I have lost a baby from this method. There are only two cases in which I could attribute death of the children to the administration of drugs, as I administered them, but there were other circumstances connected with the cases which might have been contributing factors. It is difficult for us to say what is the cause of the death of the child. In the case Dr. Harrar reported the cord was bound around the neck three times, but the child's heart was beating when the baby was born. Did the child die from the effects of the cord around the neck or from the effect of the drugs? We all know that a large percentage of babies are born with the cord around the neck, two or three or four times, and it is seldom that we find bad results to the child from this.

I feel that the results which have been mentioned here are very encouraging and may go a long way toward giving us renewed inspiration to make further experiments with these drugs, but at the same time, I think I shall continue in a very conservative way. I do not believe that I can at present be induced to carry it to quite the extent that it has been carried. I believe that the drugs should not be administered in the second stage of labor; that they should be given preferably in such a way that their effect will wear off by the beginning of the second stage of labor. I personally think that I would prefer to give ether during the whole second stage of labor, following out the effect of the scopolamin anesthesia of the first

stage, than to continue scopolamin and morphin during the second stage. I know that in that way labor may be made just as painless as if scopolamin and morphin were given. The babies can be resuscitated much more quickly because the effect of the ether wears off much sooner. Therefore as far as the mother is concerned there would be no difference, and the babies apparently would not suffer.

Dr. Rongy (closing discussion on his part).—I started this method when it was in the experimental stage. We have had one hundred and sixty cases, with no stillbirths and I think the results are encouraging.

I must take exception to the statement of Dr. Reder that pain is physiological in labor. I think it is wrong. In the course of biological evolution woman found it necessary at one time to have pain because it was an indication that labor was coming on, and she stopped her wandering to give birth to the baby, or possibly in the primitive state woman had to go through labor in order to be impressed with the baby and take care of it. There are many biological reasons for pain accompanying labor, but no physiological reasons. Woman is now sufficiently civilized to appreciate her child even though it was born painlessly.

So far as asphyxia is concerned, we misname the term. It is not asphyxia as we understand it, in the generally accepted use of the word.

Scopolamin depresses the vagus nerve ends and an increased quantity of carbon dioxid is necessary to produce normal heart action and respiration. These babies are born blue with very shallow breathing, but as soon as the carbon dioxid becomes great enough the breathing becomes deeper and the heart resumes its normal action.

I think it is our duty to educate the general practitioner in regard to the technic of this method. He cannot carry out this method in private practice simply by having seen one or two cases by rushing to a hospital. If the method is not used properly, and in selected cases, it will fall into disrepute.

There is some merit in this treatment in two-thirds of the cases if it is properly and judiciously used. There is no obstetric condition that requires more detail in technic and the display of more skill in the use of drugs than this. If the technic is not followed in detail the results will be unsatisfactory and the method accordingly condemned.

Dr. Harrar (closing the discussion).—I have not much to add to what the previous speaker has said. I took up the method at the Lying-in Hospital with the expectation of censuring it, remembering the bad results obtained by Dr. McPherson several years before. But after the first hundred cases I feel encouraged to continue the treatment further. Naturally a hundred cases is far too few upon which to base any final opinion.

As to the death of the baby with the cord around its neck, we had to cut the cord before the remainder of the delivery could be ef-

fected. There is no question in my mind but that the short cord around the neck killed that particular baby.

It is important always to compare the results of any treatment with the results in a series of cases not so treated, and we found no more asphyxiated babies and stillbirths in the cases treated with scopolamin than in a series of normal primiparous labors not so treated.

It is quite impossible for us to use safely the stock tablet of morphin and hyoscin which is used by some before general anesthesia. There is no comparison between this use of the drug and its use to alleviate the ordeal of labor. The only safe and sure preparation of scopolamin is that prepared in sterile ampoules which I have mentioned.

As to the remarks of Dr. Reder, if we can relieve the sufferings of these women safely, it is our duty to do so. Though the mother may ardently desire to hear the first cry of her baby, I have no doubt she can smile just as contentedly when the baby is first brought to her an hour later. If the male had to endure this suffering, I think he would resort very precipitously to something that might relieve the unavoidable, so-called physiological pain.

COMBINED LOCAL AND GENERAL ANESTHESIA IN MAJOR SURGERY.

BY

LOUIS FRANK, M. D.,

Louisville, Kentucky.

THE *raison d'etre* for the present rather extensive discussion of anesthetics is not difficult to understand. Those who have carefully perused the numerous contributions to the literature of this subject during the last few years have surely observed the argumentative manner by various writers concerning the method and agents in vogue for the induction of anesthesia in major surgery. For many years chloroform was the anesthetic of choice in the west and south, whereas, ether was accorded preference among the northern and eastern surgeons, but neither agent proved invariably satisfactory to both operator and patient, the reasons for which will be later more fully outlined.

It is an important surgical axiom that he who is permitted to perform operations upon the human being, fails in the performance of his whole duty unless he shall adopt every known safeguard which offers increased safety to the patient. The duty of the surgeon and his responsibility to the patient demand the adoption of methods which entail the least danger to life.

While specific discussion of the merits and demerits of chloroform and ether for the induction of anesthesia would be inadmissible in this paper, there are certain features in connection with both agents, particularly with reference to the mortality and the dangers incident to their administration, which it is believed may be legitimately included. It was formerly quite generally believed that ether was distinctly more dangerous than chloroform, because of the well-known postoperative effects and its action upon the kidneys. However, available statistics show that the average mortality from chloroform is one in 3000, whereas, that of ether is one in about 30,000 administrations. The action of both drugs is through absorption by the lipoids; both lower blood pressure, both produce marked depression—in other words, their administration is accompanied by manifestations identical with those recognized as due to shock. Chloroform has a particularly deleterious effect upon the parenchyma of various organs, producing fatty changes, and

that its effect upon the kidney is not less harmful than ether appears to have been definitely established.

In some respects the administration of ether is attended by infinitely less danger than chloroform, the remote effects have however been long recognized. The immediate dangers from its employment have been less thoroughly investigated. The essential cause of death during ether narcosis is from paralysis of respiratory function, but this accident is exceedingly infrequent when compared with cardiac failure resulting from chloroform. Although ether is less toxic than chloroform, the fact remains there are certain circumstances under which it is contra-indicated as a general anesthetic, and chloroform or some other agent must be substituted.

As early as 1800 Davy discovered the anesthetic properties of nitrous oxide when inhaled, and made the following suggestion as to its employment in surgery: As nitrous oxide, in its extensive operation, seems capable of destroying physical pain, it may probably be used with advantage in surgical operations in which no great effusion of blood takes place. His suggestion, however, remained unheeded for more than half a century.

The development of popularization of local anesthesia (including spinal analgesia) may be largely attributed to the dangers and unpleasant sequelæ incident to the administration of general anesthetics. While local anesthesia, *per se*, may not be ideal, it has a definite place in surgical practice and should always be accorded serious consideration in finally determining what is best for the interest and ultimate safety of the patient.

Those familiar with the subject no longer doubt that surgical operations of the greatest magnitude may be safely and successfully performed under local anesthesia, and by using novocaine (large quantities of which may be injected without fear of lethal dosage), according to Braun, et al., it has been possible to resect jaws, perform nephrectomies, herniotomies, and almost every other type of major surgical operation. In Braun's method of local anesthesia (the *bloc a distance* of the French), novocaine is injected well beyond and around the proposed operative field. The writer has on several occasions employed this method with the greatest satisfaction, although it is recognized that it has limitations and objections just as have other methods of inducing local anesthesia. Novocaine may be used in 1/2 to 1 per cent. solution (Braun), to which should always be added a small quantity of adrenalin, both being carefully sterilized. Of the 1/2 per cent. solution 200 to 250 c.c. can be injected without the slightest toxicity. The injection

should be made twenty to twenty-five minutes before beginning the operation.

In this connection the questions seem pertinent, (*a*) what is the principal objection to local anesthesia, and (*b*) to general anesthesia? In addition to other dangers already mentioned, ether and chloroform are markedly depressing, *i.e.*, they produce shock. To a less extent this is true of all other inhalation anesthetics, with the exception of nitrous oxide. Local anesthesia is eminently satisfactory under certain circumstances, but is inapplicable to many classes of surgery, and therefore cannot be employed to the exclusion of other means.

It has been amply demonstrated by Crile that the ideal plan is a combination of local and general anesthesia, which he has termed the "anoci-association" method. The primary object of either local or general anesthesia was to permit the surgeon to complete the required operative procedure without the necessity of inflicting either physical or mental anguish upon the patient. Therefore, the selection of a satisfactory anesthetic becomes a question of paramount importance. In addition to the dangers previously outlined, the shock entailed by the administration of chloroform and ether, particularly if prolonged, is familiar to every experienced surgeon. That there occurred severe shock to the nervous system through the special senses from the operation itself, has also been noted and commented upon by various observers, and numerous ineffective methods have hitherto been suggested for its prevention; but not until the introduction of the "anoci" or combined method of anesthesia has surgery been possible without more or less psychic influence, especially where prolonged operations upon vital structures became necessary. While the psychic effects may not invariably result disastrously to the patient, in emphasis of the fact that this is not infrequently true, it is only necessary to state that oftentimes profoundly septic patients have perished shortly after leaving the operating-table where chloroform or ether had been used. As a matter of fact, it has heretofore been frequently observed that in certain types of cases demanding operation, the administration of a general anesthetic practically meant the death of the patient. Not an uncommon observation has been that septic patients, where life-saving surgery was imperative, did not recover consciousness after anesthesia, and succumbed within a few hours. Such patients left the operating-table profoundly shocked, clammy with perspiration, and in infinitely more serious condition than when the operation was commenced. These facts led many surgeons to adopt nitrous oxide for

this class of cases. It was noted that even septic patients to whom this gas was administered would recover, or at least death did not so quickly follow the operation, and when a fatality occurred it was from the pathology for the relief of which the operation was undertaken, thus showing conclusively that in these unfavorable cases the anesthetic practically determined the outcome.

The comparative safety of nitrous oxide was demonstrated by the researches of Buchanan, who found after careful study of statistics covering many millions of inhalations of this gas that the mortality was probably about one in 5,250,000 administrations.

There can be no doubt as to the wisdom of adopting a certain definite plan of inducing anesthesia, and in all suitable cases strict adherence as a matter of routine to that particular method which has been found most satisfactory to the exclusion of others, is an important contributing factor to the safety of the patient. Moreover, as the anesthetist becomes more and more familiar with the method and the *modus operandi*, there is less likelihood of accident or error in administration, since by repeated practice perfection is attained in any branch of medicine. And of equal importance to the safest anesthetic is the "safest anesthetist."

This feature deserves most careful consideration. The anesthetist should possess adequate judgment and requisite skill, because his position in connection with the operation is quite as responsible as that of the operator. Virtually the anesthetist has entire control of the situation, and may at any time demand that the surgeon discontinue the operation even though it be unfinished. In some respects, therefore, the position of the anesthetist is of equal importance to that of the surgeon himself.

We believe that, properly administered by a competent and capable anesthetist familiar with its effect, nitrous oxide is the safest of all anesthetics for inhalation, but when improperly given or in the hands of the inexperienced in its administration, it is the most dangerous. An expert can prolong gas-oxygen anesthesia indefinitely without serious danger to the patient. If, however, an insufficient amount of oxygen be allowed, death ensues quickly from acapnia. It is therefore essential that there shall always be the proper admixture of oxygen, and this being assured, gas-oxygen in competent hands is the safest known anesthetic. Only an expert should be permitted to administer anesthetics under any circumstances, and no one can be legitimately considered expert unless he has had abundant opportunity for gaining experience and perfecting himself in that particular branch of medical science. It has been tritely remarked that no

individual can be starved so long as sufficient food is allowed to sustain life; and an appropriate paraphrase would be, that no individual can be killed with nitrous oxide gas provided sufficient oxygen be permitted to maintain life.

The writer was among the first south of the Ohio River to adopt the combined method of local and general anesthesia in major surgery (gas-oxygen and novocaine, the anoci-association of Crile) as a routine measure in suitable cases. This method has been employed for over two years, in an infinite variety and sufficient number of cases to warrant the statement that all the claims made by its originator have been fully justified. In the language of the eminent surgeon Moynihan, "the discovery of the anoci-association method of anesthesia is one of the greatest achievements in the entire history of surgery."

The advantages of the combined or "anoci" method of anesthesia are manifold, one of the most important being the guarantee of maximum safety to the patient. Psychic influence (mental shock), likewise the operative shock (traumatic excitation), which have hitherto been prolific contributing factors to unfavorable ultimate results, are eliminated by this method of anesthesia. All communication is abolished between the operative field, *i.e.*, the painful area (fear excitor) and not only the conscious but also the subconscious perceptions of the patient, which literally signifies that all psychic factors that might otherwise exert a noxious influence are rendered inoperative. There is complete severance of all nervous connection between the special senses and the brain, resulting in absence of harmful (noxious) psychic influence, with subjugation of excitation which might arouse biologic associative memory of injury, and instead of the threshold of the brain being lowered to sensitive impression it is raised. The brain cells are not exhausted in their effort (through fear of danger) to escape the trauma, there being no communication between the operative area and the brain. And this communication is not re-established until the injury has practically been repaired, *i.e.*, until there is no longer any alarm transmitted from the area of trauma, the process being one of reconstruction rather than destruction. Brain perceptions are thus adequately protected from danger through every avenue; hence no pain, therefore no biologic fear; consequently no nerve-cell degeneration, therefore no shock.

Under the combined method of anesthesia in abdominal and pelvic surgery there is entire absence of straining on the part of the patient during the operation, and there being no necessity for the use of

retractors, traumatic injury to the tissues is correspondingly minimized. There is complete relaxation and work is more easily done than under the ordinary ether anesthesia and certainly with a far greater margin of safety from the anesthetic standpoint. Contrary to the general belief there is no increase in hemorrhage under gas-oxygen anesthesia, such as sometimes occurs with nitrous oxide alone. Jactitation, muscular rigidity and cyanosis are evidences of improper administration; with the requisite admixture of oxygen the skin remains normal in color. There is absence of postanesthetic disturbances, such as retching, vomiting, intense thirst, and the fearful expression of anxiety so commonly observed under the older anesthetic methods.

Since adoption of combined anesthesia it has been possible to successfully operate upon many patients who would heretofore have been considered inoperable risks, *i.e.*, in aggravated cases of enlarged thyroids where the condition of the patient was desperate; patients with marked renal, cardiac and arterial complicating lesions; profoundly septic patients suffering from pathology demanding immediate surgery. The primary mortality in unfavorable cases has been materially reduced and in selected cases no immediate fatalities have occurred where the combined method of anesthesia was employed. The remote mortality has also been markedly lowered, with reduction of postoperative discomfort to the minimum. Patients do not complain of postoperative pain (the so-called gas pains, etc.), there is little or no abdominal distention, and altogether they are much more comfortable in every way than those operated upon under the older methods of anesthesia.

Briefly, the combined local and general method of anesthesia (anoci-association) may be described as follows: From a half hour to fifteen minutes before the operation the patient is given an hypodermatic injection of morphine and atropin, morphine and scopolamine, or morphine plain, dependent upon the judgment of the anesthetist. The patient is taken directly into the operating room where gas-oxygen is administered as the anesthetic. The field being prepared, the line of proposed incision is injected with a 1/4 per cent. novocaine solution. After incising the skin and fat, the fascia and muscles are likewise injected. The incision is then continued until the depth of the operative field has been reached. In abdominal surgery the peritoneum, after being opened, is reflected and injected beyond the line of incision with novocaine followed by quinine-urea-hydrochloride in 1/2 per cent. solution. The mesenteries are also injected with novocaine solution before their

division. This is true of the intestines, the gall-bladder, the appendix, the uterus and the appendages. In renal surgery the injection is extended well around the kidney, although as a rule this organ, like other intra-abdominal organs, is not very susceptible to contact impressions. After the tissues have been divided, all suture lines and areas in the track of ligatures and proximal thereto are injected with the quinine-urea solution. Before the incision is closed, the muscles, fascia and skin are also injected with quinine-urea behind the proposed suture line. The novocaine solution must be well distributed by pressure before incising the tissues, and the quinine-urea solution should be injected well behind the operative field.

Nothing included in the foregoing should be construed as meaning that the combined method of anesthesia described is inapplicable to surgery in situations other than the abdominal and pelvic cavities. It is equally valuable and may be as advantageously utilized in the surgery of other regions where the administration of an anesthetic is required, *e.g.*, the writer has quite recently performed several radical breast operations under this method of anesthesia; in no case was there the slightest pain or discomfort following the operation, nor were the patients really aware that any surgery had been performed upon them. Even in those instances where for good and sufficient reasons gas-oxygen cannot be used as the anesthetic and ether has to be substituted, it is my practice to employ the "blocking system" with novocaine and quinine-urea, the latter being routine in all operations in a clean field.

The time factor in major surgery, upon which much emphasis has heretofore been placed, is not of such serious consideration when the combined method of anesthesia is used, since the most dangerous factor (shock) is thereby totally eliminated. Contrary to previous teaching, even under the older methods of anesthesia, the factor of time, *per se*, was important as a result of the shock induced by the anesthesia and not because of the surgery. It was at one time believed that hemorrhage and shock were synonymous, but the fallacy of this hypothesis has been amply demonstrated. The effects produced by each upon the brain cells are, however, similar in thier significance.

In conclusion: It matters not what method be selected for the induction of anesthesia nor who the anesthetist, it must be obvious that neither the immediate safety of the patient nor the ultimate outcome depends solely upon these factors. The responsibility of the surgeon and his duty to the patient require that he shall not be

lacking in either anamnestic erudition nor operative skill. Other important features are: The observance of the strictest aseptic precautionary measures and the handling of tissues not with haste but with tenderness and a loving care. The careful execution of every operative detail, and the maintenance of requisite hemostasis. Determination as to physical condition of the patient as an operable risk, and finally, the exercise of mature surgical judgment.

400 THE ATHERTON.

Note.—In the preparation of the foregoing paper, the author has drawn liberally from material presented in former contributions. Vide *International Clinics*, vol. ii, Series 24, 1914, pp. 177–198; *American Medicine*, July, 1914, pp. 470–473; *International Journal of Surgery*, July, 1914, pp. 239–243; *Kentucky Medical Journal*, April 1, 1914.

SOME CLINICAL OBSERVATIONS IN EUROPE.

BY

PALMER FINDLEY, M. D.,

Omaha, Nebraska.

In these days of Teutonic disfavor it is a very special privilege to testify to the good qualities of our Prussian colleagues. It was my good fortune to spend several weeks prior to the war in the Franz clinic of Berlin. I selected this clinic because of the wealth of material and the conservative tendencies of the clinical staff.

Two features of the clinic were particularly noteworthy—the brilliant operating of Prof. Franz and the skillful cystoscopic work of Prof. Fromme. Incidentally be it said that both of these clinicians enjoy well-deserved popularity with the American colony. Prof. Franz is admittedly the most dexterous operator in the Frauenkliniks of Germany. His Wertheim operation for cancer of the cervix is completed in thirty-five to forty-five minutes and is more radical than the operation performed by Wertheim himself. While Wertheim excludes 50 per cent. of all cases, Franz operates 90 per cent. of all cases; and the percentage of cases living, after five years from date of operation, is not less than that of Wertheim.

Certain features in his technic contribute largely to Franz' brilliant results. He operates with spinal anesthesia. His incision is transverse and is of unusual width. His retractors permit of wide exposure of the field of operation. The illumination of the field, by artificial light, permits of no shadows. He is most ably assisted by his staff.

The obstetric side of the clinic bears the stamp of conservatism. It is the largest obstetric clinic in Germany. About 4000 cases a year are delivered in this clinic. Eclampsia is treated along the lines laid down by Stroganoff, *i.e.*, the administration of chloral and morphine at definite intervals and the letting of blood. All heavy operative procedures are proscribed. There is little else than low forceps permitted.

One patient delivered herself of a dead fetus after three days of coma and convulsions. Another was delivered on the fifth day of a dead baby by low forceps. Both were grave cases of eclampsia and yet at no time was operative intervention considered. It was admitted that such conservatism would not be adopted in private practice. In

all 200 cases had, so far, been treated along these lines with the result that the maternal mortality had decreased from 12 per cent. to 9 per cent. and the fetal mortality increased from 17 per cent. to 47 per cent. Still they were not satisfied to pass final judgment on the method of treatment. Similar conservatism marked the treatment of eclampsia in the Glasgow maternity. In London there was a general tendency toward early operative interference in eclamptic cases.

In the management of placenta previa the Franz clinic lays down the inflexible rule to perform abdominal Cesarean section only in a central implantation of the placenta in a primipara. In all other conditions the hemorrhages are controlled and dilatation secured by means of a gauze pack or colpeurynter. It is an inflexible law that version, in a primipara, is never justified except in transverse presentations. Rather than perform version in a primipara, resort is had either to Cesarean section or craniotomy. Fear of rupture of the uterus is given as the reason for the dictum.

There was a young woman in Franz' clinic in the thirty-sixth week of gestation. She had a Cesarean section in her previous pregnancy two years before. The pelvis was moderately contracted, and there was slight bleeding from a marginal placenta previa. Prof. Franz advised against Cesarean section because of the questionable viability of the child, and directed that a hydrostatic bag be introduced and that the fetal head be perforated in delivery. The bag was introduced and pains became forceful within half an hour. A few minutes after the onset of pronounced uterine contractions the uterus ruptured through the scar of the former section and the fetus escaped into abdominal cavity. No time was lost in removing the escaped fetus and in performing a hysterectomy. The patient died in shock.

A critical examination of the uterus showed that the uterine musculature had never healed, that it was so separated as to form a wedge with the base at the uterine cavity and the apex at the peritoneum. Prof. Franz, commenting upon the case, said that henceforth he would make two radical changes in his conduct of cases requiring Cesarean section; first, he would make the incision in the fundus rather than in the lower uterine segment, and second, he would advise against allowing labor to proceed in any case in which there had been a previous Cesarean section. He was of the opinion that one hysterotomy called for another in a subsequent pregnancy, because it is never possible to judge of the character and resisting power of the scar.

At the Glasgow Maternity this point was further emphasized by Prof. Jardine and Dr. Samuel Cameron. Prof. Jardine performed a Cesarean section prior to the onset of labor, because the uterine scar of a previous section appeared to be extremely insecure. He laid down the dictum that rupture of the scar of a previous section is liable to occur as a result of the powers of labor, and therefore it would be safer to anticipate labor by a second section, and this to be followed by the sterilization of the patient. Dr. Samuel Cameron showed three specimens of uteri in which rupture had occurred through old scars of previous Cesarean sections. In all of them the musculature had failed to unite, leaving only a thin peritoneal scar to resist the intrauterine pressure of labor.

Pituglandol is preferred to pituritin in the Franz clinic and is given intravenously. With scarcely an exception the pains became strong within forty-five seconds following the injection. It was observed that less than 1 cm. was injected in some cases for fear of the depressing effects of the drug when given in the vein.

In the Rotunda Hospital of Dublin I was told that pituitrin had largely eliminated the forceps in the delivery of their cases.

A casual observer in the Franz clinic cannot but be impressed with the ultra conservative management of their cases. They were operating upon very few uterine fibroids. The only fibromata not treated with the *x*-rays were submucous, degenerated tumors and impacted growths causing pressure symptoms. What success they are having has not yet been determined. In the polyclinic I saw several cases which had received but temporary benefit from the *x*-rays. In these cases hemorrhage had stopped for a few months and had returned. Very few of the fibroids showed any considerable decrease in size as a result of the application of the *x*-rays.

Practically all the pelvic inflammations were treated by the Finson rays but the results were not clearly demonstrated for want of time. They believed, however, that they had gone far enough with their observations to warrant the assertion that the Finson rays are the most effective means available of relieving discomfort and favoring absorbtion of inflammatory exudates.

The Alexander-Adams operation is the operation of choice in retrodisplacements, though comparatively few cases are operated. Most of them are treated by massage, pressure therapy and the pessary.

One deplorable fact is mentioned because of the lesson it conveys. There is a large percentage of infection in the lying-in wards. This is due in part to the very old building, in part to the class of cases admitted, and to the interference of midwives in the home before

sending the patient to the clinic. But the major part of the infections, I believe, can be charged to the practice of making repeated digital examinations by students as well as assistants.

The Glasgow Maternity presents unrivaled opportunities for the study of contracted pelves. There were sixty patients in the maternity and eighteen of them presented varying degrees of contracted pelves. Glasgow is cursed with rickets and, as a result, one will find a larger percentage of abnormal obstetric cases in the Glasgow Maternity than in any place in the world.

A visit with Professor Abderhalden in his physiological laboratory in the University of Halle was exceedingly delightful and profitable. I found him most genial and unassuming. He feels very kindly toward Americans because of the generous support they have given his work. Some surprise was expressed that the profession should find his test for pregnancy so complicated. "It is really very simple" said he. He is royally supported by all the clinicians in the University of Halle; but he has many antagonists throughout Germany. In his laboratory are a score of workers who have come from the various clinics of Europe to acquire the technic. They are finding the test reliable in 98 per cent. of cases. Professor Abderhalden spoke of numerous cases of interest. He referred to a calcified mummy *in utero* that was diagnosticated by Bumm as a fibroid tumor. A positive placental reaction was obtained in this case. Again he referred to a case of Doederlein in which a curettage had been performed for sterility. Ten days later a positive reaction for pregnancy was obtained, and later developments proved the existence of pregnancy.

In cancer cases Abderhalden is getting from 80 to 90 per cent. of reliable results. He says that his results would be still better if the clinical data, accompanying the specimens, were more accurate. Two cases were cited. The first was that of a tumor of the breast which was diagnosticated by the surgeon as cancer, but which did not respond to the clinical test for cancer. The clinical findings were clearly those of cancer so that the surgeon operated but found an abscess. The second case was in the surgical clinic of Halle under the clinical diagnosis of cancer of the liver. The diagnosis of cancer was confirmed by the laboratory test. Upon operation there was found an adherent gall-bladder full of stones. No evidence of malignancy could be found. A subsequent postmortem examination excluded all other evidence of cancer. A third case recited by Abderhalden was that of a woman operated upon for a tumor of the uterus. This tumor appeared twenty-seven years after the last

pregnancy. A positive placental reaction was obtained and the tumor removed proved, on microscopic examination, to be a chorioepithelioma malignum. Abderhalden expressed the opinion that his work might prove to be of prophylactic value in these cases. Abderhalden claims 80 per cent. of efficiency in his tests for tuberculosis, and in syphilis, he affirms, the results are better than with the Wassermann test. In dementia precox he has had 100 per cent. of good results in a series of 2000 cases. In the kidney of pregnancy, and in cirrhosis of the liver, good results are obtained. The opinion was expressed by Abderhalden that his method would apply in theory to all infectious diseases, new formations and degenerations.

418 Brandeis Theatre Building.

THAT SYMPTOM LEUKORRHEA.*

BY

DOUGLAS HUNT STEWART, M. D., F. A. C. S.,

New York.

Although the theme is trite and has been worked over for centuries by physicians, yet, to-day finds a writer addressing an audience, that knows more about the text than its literature contains. There remains a single hope of arousing interest by pursuing an exploratory by-path and avoiding the beaten track.

If one wipes out a vulva and examines the "wipe", he may find germs, foreign bodies and most conditions that appear to be premises to an inference of sure infection. Environment is bad; but anticipated evil is contradicted by the vagina insisting on maintaining sterility, let its walls be sodden or shrunken and its discharges profuse or scanty. Collections (platinum loop) from the driest spots in the middle third of the canal have furnished the fewest specimens of the gonococcus when the cervix, little vaginal pools and vulvar pockets have yielded abundant material for culture purposes. Acidity of the soil usually means germ-repulsion, and "favorite habitats" imply that a neutral reaction has paralyzed the energy of all defensive factors. They are inert, no matter how intense their combined efficiency might be if the proper degree of acidity should prevail.

A curious smear-apparatus furnishes lubrication, when required, quite independently of the mural exudate. A dry tube, greased solely at its ends, together with a rather loosely fitting cork to be pushed through it, will afford a rough schema.

Secretion, the germ-inhibitor, is a blood derivative proportionate to the variations and development of the circulation. Mucus, a germ-protector, is a lubricator depending on the muculent production of certain glands. Anatomy says: "The mucous membrane has a few mucous crypts; but not true glands."

A glycolic acid is present in the vaginal flow in a maximum amount of 2 grains to the ounce, but abnormal conditions may change the reaction to frank alkalinity; though even then, a careful dry-cleansing and subsequent trial with litmus, may make manifest an acidity that is merely concealed beneath an alkaline flow-coat of uterine origin. A common strength potassa test is 1/4 per cent.; this proves to be superior to 1 per cent. grape-sugar lactic acid when pitted against staphylo-streptococcus. Vaginal fluid proving four

times as strong a germicide as an artificial, solution, led to the deduction that some synergist must be at work. Comparison with gastric juice shows there a surprisingly high resistance to putrefaction, a power which seems to be lacking with the vaginal flow which, to replace it, has direct external drainage.

My earnest thanks are due to the *Lancet-Clinic*, its business manager, its laboratory, the Cincinnati General Hospital and Dr. Thomas H. Kelly, who came to my aid with a corroborative report, from which this paragraph is quoted: "The uterovaginal secretion contains leukocytes, both intact and broken down. The antibacterial properties of it probably depend upon these liberated antibodies rather than upon the concentration of the lactic acid present."

The accidental appearance of yeasts need not be noticed. Deliberate probation as to their therapeutic value has caused a crop of rose-colored reports in which there is "no such word as fail" and success waits upon topical employment.

A "detail man" endeavored to correct my technic by explaining that the yeasts must be mixed with milk, allowed to grow for a week, and the vagina tamponed with the curds. The yeasts were not a factor, the process gave some results and the odor was a prohibitive stench. From the use of curdled milk (lactic acid) to experimentation with the Squibbs product was a natural step. Four hours after douching (2 drams to the quart) the acid content of the vaginal secretion dropped to one in 1000. Nature either did not wish so much lactic acid and shut off the patients supply, or the old dictum of Ringer still holds good that "acids diminish acid secretions." A grain to the ounce was often found after a similar use of acetic acid and this, upon trial, gave better clinical results than either lactic acid or soured milk with or without yeasts.

Leukorrhea is termed a discharge, not a disease. It may be a disease-carrier. Traumatism is the result of grave surgical injuries. Grave is not synonymous with extensive. Mosquitoes have killed more than lions; and solutions of continuity, from erosion, or cauterization, cause breaks in a defending mucous membrane, and thus open entrances to invaders as surely, if not as largely, as birth lacerations may. Should the sole invader be the gonococcus, a caustic might be the agent devoted to peeling off a sheet of membrane and including therein the germs of a surface infection, a hope that is not realized with a mixed invasion because removal of the membrane is a clearing away of an obstruction and a making smooth the pathway of peptonizing tissue-melters—the so-called pus producers. Therefore cauterization either cures by burning, or an infected burn ensues.

All wounds should be healed, especially invisible ones. Modern medicine is learning lessons from ancient domestic practice. The septic thumb (felon, etc.) inserted into the hollowed-out lemon, combined with copious drafts of "*Cream-er-tarter-lemenade*" is archaic. Lemon juice forms citrate of soda in the depths of wounds and amounts to citrate of soda when the blood is encountered by means of internal administration. The effects of citric acid upon brawny swellings is well known and the literature is ample. Before Lister's time vulneraries were much used. When his work was considered final they were deemed unnecessary and abandoned. A few years ago my acquaintances were experimenting with the application to wounds of fresh placental membranes, later extracts were used; their virtue was found to reside in allantoin. This gave prompt and good results when applied to cervical wounds, erosions, etc. Then I was furnished with a cheaper product made from uric acid and, finally, the importers sent me some made from comfrey root; the favorite ingredient of the early vulneraries. It is a splendid healer; but owing to the large amount which a single vaginal treatment demands, combined with its high cost, I was compelled to look elsewhere. My supplies have been turned over to surgical friends who will furnish further news of its use. After experimenting with Wright's solution, the one in use in the surgical clinics of the J. Hood Wright Hospital was added. Then there followed a good deal of study with various solvents (glycerin, oils, etc.) because water is detrimental to a mucous membrane. Kaolin and various insoluble powders were tried.

Eventually, and from work upon another subject, came a question of osmosis and specific gravity, to wit, "Since dehydration is dependent upon the response of a patient's tissues to the demands of an external and higher specific gravity upon internal fluids, therefore, molasses must be more powerful than glycerin if its specific gravity were greater." It proved to be so; but the dark staining involved caused the use of sugar, a substance which is converted into lactic acid by a lactic acid secretion. Milk sugar possesses the single advantage of not forming lumps. This has not been a matter of importance.

Cane sugar, milk sugar and glycerin, increased the specific gravity of the vaginal fluid from 1010 to 1300, 1250 and 1200. Saturated solutions compare with glycerin as 1350 and 1300 to 1250. And the solid sugars as 1600, and 1500 to 1250. The vaginal fluid averaged 1012 with a minimum of 1010 and maximum of 1016.

When the discharge continues unabated after repairs, electricity,

cauterization, hydrotherapy, etc., then this régime has been successfully adopted. Order the patient to drink:

1. On rising, a pint of cream of tartar lemonade.

2. An additional tumblerful of plain lemonade (two lemons) after each meal. No. 2 should be observed only if there are masses or swellings in the broad ligaments.

3. On Monday, Wednesday and Friday apply the following powder, using a small spoon introduced through a speculum: ℞ Sublamine gr. ii. Sod. Cit. ℈ii. Alum, ℥iii; Sod. Chlorid, ℥ss; Plumbi Acetat., ℥vi; Sugar q.s. ad lb. i. Cover cervix and fornices and tampon lightly The powder blower is a failure owing to back draft. Leave tampon in place twelve to twenty-four hours. Sugar pushes up the specific gravity, causes an increased secretion which converts the whole powder into Wright's solution plus aluminum acetat plus white lead. An object lesson, with ocular proof of its efficiency, will be furnished by its application to any external, preferably septic, wound or burn. Secretion in the vagina is increased, but becomes clear and watery. In treating the profuse flow occasionally found at, or after, the menopause, the mucous membrane must be fed and not dehydrated. Thymol iodide in cod-liver oil (10 per cent.) is as good here as upon sluggish wounds of old people, and neither gumma nor cancer contraindicate its use. This treatment can be alternated with the acetic acid douche twice a week, and the use of the powder once a week.

In the senile form of leukorrhea the administration of iron was of trifling advantage, three patients had an adverse idiosyncrasy, and one teaspoonful of the syr. hypophosphite of lime before, with 1/25 grain of arsenic iodide after each meal, were substituted with happy results. Gout, rheumatism, lithemia, mild scurvy and urticarial tendencies were magnifiers of vaginal evils; but the two remedies, plus lemon juice, seemed to improve them all.

4. On Tuesday, Thursday and Saturday the douche of acetic acid (36 per cent.) is advantageous (℥i or ℥ii to qt. i).

Iodine, carbolic, silver, etc., appear to lose some of their harshness when used in conjunction with the powder; but when the powder is used alone it preserves and reinforces the patient's defensive powers; it increases her secretion because of its superior specific gravity. This is quite a different matter from stimulation with an irritant that tears away nature's shield of epithelium and opens the subepithelial spaces. Osmosis, acidity and antibodies delivered from tissues that are soothed and repaired by a tranquilizing vulnerary, which is also an active germicide, might broadly be termed "aiding nature."

On the other hand, sincere, conscientious attempts at obtaining asepsis through the employment of irritant applications, produces a harvest of damage and inflammation.

If a given case has been untreated, maceration and erosion must depend on the destructive potency of the discharges. As these often emanate from intrauterine infections, their sources should be attacked; but even here it is sometimes surprising to notice the change for the better, in both discharge and uterus, which will promptly follow the adoption of the measures which have been indicated.

128 West Eighty-sixth Street.

PRIMARY CARCINOMA OF LIVER IN A CHILD.

BY

MAGNUS A. TATE, M.D.,

Cincinnati, O.

(With two illustrations.)

THE following case report is, unfortunately, not complete, the diagnosis having been made clinically only. An autopsy was not permitted.

Patient, aged ten, female, small for her age. Family history: Father, aged forty-two, 5 feet 10 inches tall, weight 165 pounds, strong and healthy. Mother, aged (?), delicate, height 5 feet 2 inches, weight 116 pounds, and looks tubercular. No history of carcinoma. Father's family negative as to tuberculosis; but the mother had a brother who died of tuberculosis following a long debauch. No specific history. There are two other children, aged two and six years respectively, both healthy.

History and Examination of Patient.—Measles at the age of three, scarlet fever at nine, and two or three attacks of inflammatory rheumatism during the past two years. Patient has not been well since the attack of scarlet fever, and has been failing steadily for past six months.

The patient was first seen January 16, 1913. She was very pale, nervous, and cried almost constantly. The mother informed me that child complained of a constant pain in the right side of the abdomen, that it was very constipated, sleeps poorly and suffers incontinence of urine at times. Temperature, normal; pulse, 94. On examination of the abdomen a mass was easily seen and palpated over the region of the liver. It was hard to the touch and about the size of a cocoanut. Abdomen slightly distended.

Advised removal of patient to hospital for satisfactory study and observation; and, if deemed advisable, an exploratory incision. No positive diagnosis made. Parents refused to take the child to hospital and would not consider an operation.

In the latter part of March, 1913, I was again consulted, earnestly requested to take charge of the patient and to do whatever I deemed best. Patient was sent to Bethesda Hospital.

The tumor mass is outlined by a dark line in photograph. Examination revealed an anemic and cachectic child, very thin, and of waxy color. Weight, 60 pounds. An enormous mass extended from under the ribs of the right side over to the left and down nearly to the pelvis. It occupied about two-thirds of the abdomina

cavity. Many physicians had seen the case since my first visit, and various diagnoses had been made.

Brief report of examination: *x*-ray unsatisfactory; blood examination simply showed marked anemia; urinalysis, sp. gr. 1020, reaction alkaline, trace of albumen, no sugar, a few hyaline casts, and phosphates in large quantity.

Primary carcinoma of liver. (Two photographs of patient taken at the hospital.)

Lungs and heart negative. An operation at this time seemed out of the question. But the parents insisted upon, and I consented, that at least an explorative incision be made under a local anesthetic. This, however, was found impractical. The child was very

restless, screamed and cried so that we were forced to abandon our efforts at local anesthesia and resort to ether narcoses. On opening the abdomen to the right of the median line and near the umbilicus, a little brownish fluid escaped. The tumor proved to be an enlarged liver. The surface was uneven, very hard to the touch. It was of a reddish-brown color, showing, here and there, an elevated grayish nodule. The examining hand encountered a few adhesions easy of separation. The remaining abdominal organs seemed to be free from disease. No attempt was made to remove a piece from the liver for microscopic examination. I did not care to do more than make a clinical diagnosis at this time for fear of an uncontrollable hemorrhage and a section of it might be obtained later. The child did not seem any the worse for explorative incision. Pulse remained about 100, and temperature normal. She rallied nicely from the operation and did well for four days; after that she sank rapidly and died on the fifth day. Much to my surprise and chagrin no autopsy allowed. My diagnosis was primary carcinoma of liver.

I find that Castle (*Surgery, Gynecology and Obst.*, April 19, 1914) has written a very comprehensive article on "Primary Carcinoma of Liver in Childhood" and he concludes by saying: "There are reported in literature forty-two cases of cancer of liver in childhood (under sixteen) with the majority of diagnoses accurately made." If my case was a true primary growth, and I believe it was, a rare affection was encountered.

THE SIGNIFICANCE OF UTERINE HEMORRHAGE.

BY

H. WELLINGTON YATES, M. D.,

Detroit, Mich.

This brief paper and appended case reports are submitted to this Association to emphasize the necessity of a more critical and painstaking diagnosis. Dr. Mix of Chicago, says that 60 per cent. of all the time given in making a diagnosis should go to a careful history-taking. So true is this in the study of the subject that, should all the other means be taken from us, careful, thoughtful and analytical history-taking would furnish more correct diagnoses than are now made with all the other diagnostic methods and the history carelessly passed over.

The study of pathology depends upon our knowledge of anatomy and physiology. We cannot expect to detect pathology unless we observe and have at our command the story of the normal physiology of the patient. Each woman has a menstrual history of her own. It is essential to find when that history changes and the bearing this will have on her morbidity.

Normally, and usually, women menstruate at intervals of twenty-eight days, the duration of the flow varying from three to five days. Yet this does not mean that women may not be well and strong in the absence of regularity as to periodicity or duration of menstruation. Some women regularly have an intermenstrual period extending several days beyond four weeks, others menstruate at intervals of two, or five, or more months. Some women menstruate every three weeks or less. The same variation may be noted as to the duration, quantity and quality of the flow. We all know of such instances. Yet in many of these patients these irregularities seemed naught but physiological. We should study then these peculiarities and variations in physiology and when we meet a patient who departs from the normal type of menstruation she should command our fullest attention and consideration. For some time, and especially the last few months, I have been appalled at the ignorance of so large a number of women regarding their generative organs and the extent to which they neglect themselves even when they know they are not well, and what is worse is the carelessness of some physicians who, when consulted by these patients, treat them indifferently,

though some of these poor victims may already be lost to the inroads of malignancy.

Let me interject here that notwithstanding what has been done to educate the laity along this line in medical societies by distribution of reprints and by publishing articles on the subject of cancer in the lay press, as well as lectures to mother's clubs, etc., we should have more of it still. It is not too much to say that we should commence this education a little closer at home. There is no curative treatment for advanced cancer. All successful treatment depends upon an early diagnosis when the disease is still localized. Too much has been said about the cancer age. There is no cancer age. Cancer attacks all ages. My small experience teaches me to view with suspicion all women who have abnormal bleedings from the uterus.

Case I.—Miss T. G. Admitted to Providence Hospital April 19, 1913. Aged twenty-three, occupation, journalist. She had been regular in her menses, both as regards duration and quantity until one year ago when she began to have an offensive discharge. This was soon followed by a more profuse menstruation and a little bloody discharge between periods. She never had consulted a physician until the day before her admission to the hospital. Six months before coming to the hospital she began to have indefinite pelvic pains. An examination showed the whole vagina, filled to the vulva, the site of a carcinomatous growth. She was never treated for this. She probably had this tumor for one year. Her history would indicate it. Thus the disease began in her twenty-second year. She died July 21, 1913, three months after admission to the hospital.

Case II.—Dec. 14, 1912, Mrs. A. B., aged twenty-four. German extraction, dressmaker by occupation and always enjoyed good health. Four months ago she married and then she noticed that after each coitus she bled moderately for twenty-four hours. Her menses up to four months before her marriage had been regular; since then the quantity of blood lost remained the same, but the menstrual period was prolonged. She never had been pregnant. She consulted a physician who gave her local treatment for about two months. One of her first questions was: "Is it natural for a woman to have this experience when married?"

Examination revealed a profuse bad-smelling discharge and a crater-shaped cervix with widespread induration extending half way down into the vagina. Pelvic organs fixed. She was inoperable; though the actual cautery was used twice. She lived four months.

Case III.—Mrs. M. F., of Birmingham, housewife, aged twenty-six, married, mother of one child which died at birth. Mother died of cancer of uterus. Father died at age of thirty-five, cause unknown. One brother living and well. Never was ill, except measles during childhood and "inflammation of ovaries" lasting two weeks. Menses regular until seven months ago.

Present illness began six months ago with pain in lower abdomen and menorrhagia. Four months ago patient began to menstruate every two weeks; gradually she lost all knowledge of regularity, flowing a few days, then stopping a day or two. During this time she had pain in her lower abdomen and was losing weight. Five months ago she was curetted by a physician who said a great deal of soft material scraped away. The scrapings were not examined microscopically.

Patient came to St. Mary's Hospital June 15, 1914, with a foul-smelling discharge, which had been constantly present since the curetment. Patient has lost 25 pounds in weight.

Physical Examination.—Heart and lungs normal. Urine shows trace of albumen. Her skin is very pale and muscles are flabby. Hemoglobin 30 per cent.; leukocytes 10,500; red cell 1,900,000. Abdomen negative. Vaginal examination reveals excessively ulcerated and enlarged cervix. The uterus and upper vagina are fixed and bleed upon touch. What had been the cervix was a mass with crater formation which had invaded the right parametrium. This was an inoperable case save for cauterization.

CASE IV.—Miss J. Z., aged thirty, native of Austria. Always well until three years ago. First menstruation at sixteen; regular thereafter until three years ago, when she was troubled considerably with prolonged painful menstruation. Had one ovary and appendix removed at that time. Menstruation again became regular and remained so up to the present complaint. About five months ago she began to have pain and distress in lower abdomen with prolonged painful menstruation. These symptoms gradually increased in severity.

She was admitted to the gynecological service at St. Mary's Hospital May 21, 1914. Examination of respiratory and circulatory systems negative. The cervix uteri was soft and infiltrated. The right parametrium was involved sufficiently to fix the uterus on that side. Curetment, May 23; laboratory reported carcinoma on May 26. A panhysterectomy was performed. She returned this month with recurrence of the growth and metastases.

These four cases offer sufficient illustration to show that age and celibracy offer no immunity to cancer of the uterus. The two cases treated by physicians for two and five months respectively by "local applications" was little short of criminal.

CASE V.—Mrs. C. P., aged twenty-six. Housewife, Polish. Was admitted to the gynecological service at St. Mary's Hospital April 21, 1914. For years she had had trouble in the lower abdomen, accompanied by menorrhagia. Her condition became worse of late. Uterus and adnexa were firmly fixed. A double salpingectomy with the removal of left ovary was done. At the same sitting the uterus was curetted and scrapings sent to laboratory. April 24, the pathologist reported carcinoma of fundus uteri. Patient refused hysterectomy and left the hospital on May 6, 1914.

CASE VI.—Mrs. C. B. Housewife, Belgian, aged twenty-nine. Healthy and strong. Was admitted to clinic at St. Mary's Hospital in July. We were unable to get a clear history on account of not

having an interpreter, but learned that, usually, she was regular in her menstruation, but three or four months ago she had missed her period for about three weeks. She began to flow more or less constantly. Physical examination was negative, except that uterus was soft and somewhat enlarged. She was curetted. The laboratory reported chorioepithelioma. She refused a radical operation.

Case VII.—Mrs. M. V. Housewife, aged thirty-nine. Admitted to St. Mary's Hospital July 1. Menses had been regular both as to periodicity and length of time; but during the last months the flow was more free. She also bled between periods, a day or two at a time, especially after coitus. Pain was not present at first; laterally it has become a constant factor. Examination shows a large soft cervix, normal fundus and adnexa. The curetment showed soft scrapings from the cervix. Pathologist reported adenocarcinoma. The patient refused further operation.

Case VIII.—Mrs. J. W. T., aged fifty-two. For several months menses had become more scant but much longer in duration and she would sometimes flow a little at short intervals for two or three weeks. For the last two months she has lost blood constantly. Before this she had noticed that intercourse, though painless, was always followed by slight bleeding. She had no pain. July 1, she was curetted. The laboratory findings showed carcinoma of the fundus. Five days later a panhysterectomy was done. The uterus was normal, though small in size. Cervix and adnexa normal.

Two of the last series of cases show that youth is not exempt. All show the necessity of routine examination of curetings. Three of the cases would have gone on to a hopeless development of the disease had this simple measure not been adopted.

The limits of this paper permit me to call your attention only to some of the more common forms of suspected malignancy. I have not spoken of the class of cases which are associated particularly with menorrhagia; nor have I referred to the menorrhagia due to myomata. All of them may be diagnosticated by the character, quantity and time of the bleeding. The above cases are detailed to illustrate the object of the paper and to show how easily they may be found when we look for them. Six of the cases have occurred in my recent service at the two hospitals with which I am connected. I desire to express my appreciation to Dr. A. O. Brown of St. Mary's Hospital, who assisted me in the case records here submitted.

Since writing the above paper, Mrs. H., of Florida, aged forty-four, was referred to me with a history of normal menses and generally good health until six months ago. She ceased to menstruate at that time but this was followed by a discharge which has remained offensive up to the present. Examination shows considerable of a growth in the left parametrium. Visual examination shows the

cervix is almost entirely sloughed away and a carcinomatous mass exists all over the vaginal vault. I only add this report because it has bearing upon the necessity of educating women to seek the advice of a competent physician at an early date.

CONCLUSIONS.

1. Information should be disseminated among the public concerning the early signs of cancer.

2. The cases here reported, with few exceptions, indicate that the malady is not recognized as early as it should be, even by physicians.

3. All uterine or supposed menstrual bleedings, which are unusual, should command our keenest attention and observation.

4. All curetings should be submitted for examination to a competent pathologist.

5. Pain has no part in early cancer; it is a complication and only follows after the disease has developed.

6. There is no "cancer age." Too much emphasis has been placed upon this point in text-books. Most of the cases referred to were among the young women.

7. Microscopic examination is the sovereign method in the diagnosis of cancer. Its use can be dispensed with only in those cases in which the cervix is open and the protruding mass is, beyond a doubt, carcinomatous; or when a digital exploration furnishes conclusive evidence of malignancy.

1360 Fort Street.

EXTRAUTERINE PREGNANCY WITH A REPORT OF THREE UNUSUAL CASES.

BY

THURSTON SCOTT WELTON, M. D.,

Brooklyn, N. Y.

VOLUMES have been written from every view-point on the subject of extrauterine pregnancy. Scientific schools have taken sides concerning various phases of this subject, still open to debate. This short paper will merely classify and make more conspicuous the essential points that interest the abdominal surgeon. The writer will also report three unusual cases of ectopic gestation that he has had to deal with.

Burrage has aptly defined extrauterine pregnancy as, "the development of a fertilized ovum at some point between the Graafian follicle in which it originates and the uterus." The classification of ectopic gravidity is not constant with all writers. A simple and comprehensive classification is here given:

1. Ovarian pregnancy, when the ovum develops in the ovary itself.

2. Abdominal pregnancy. A primary abdominal pregnancy does not exist. It is either the result of a tubal rupture or abortion, slow in character, and in which the ovum continues to live.

3. Tubal pregnancy, when the pregnancy occurs in any portion of the Fallopian tube. They have been accordingly, tuboovarian pregnancy, tuboabdominal pregnancy, and tubouterine or interstitial pregnancy.

Pathological and clinical studies bear out the fact that gonorrheal salpingitis is the predominating cause of tubal pregnancy. The ascending gonorrheal infection attacks both tubes, as a rule. It is not unusual that one is called upon to operate for an ectopic gestation, say on the right side, and so find the left tube apparently normal. Later a pregnancy takes place in this tube. For this reason some surgeons, when operating for extrauterine pregnancy, remove both tubes.

Opitz, in twenty-three cases of ectopic gestation, found adhesions in nineteen, and kinks, constrictions, and subserous cysts in the remaining four cases. Ladinski, in a series of 150 cases, observed similar conditions. Ott and Peterson, in all of their cases, obtained a history of previous gonorrheal inflammation. Pelvic peritonitis,

from any cause, both within and without the tube, may be regarded as a cause of extrauterine pregnancy.

Two theories have been upheld as the most frequent cause of ectopic pregnancy: 1. Mechanical obstruction by bands, adhesions, kinks, etc., and 2. Pathological and physiological changes in the tubal mucosa. Virchow, Martin, Wyder and Schauta upheld the former theory; laboratory experiments on animals by Lataste, Mandl and Schmidt disproved the latter.

In the severe forms of gonorrheal salpingitis uterine or extrauterine pregnancy are impossible. It is the mild or catarrhal forms of salpingitis that predispose to ectopic gestation. After the active inflammation subsides it is found that the cilia of the epithelial lining of the tubes are lost. R. R. Huggins claims he never found ciliated epithelium in a tube the seat of a salpingitis or pregnancy.

Schroeder, Tait, Veit, Wyder, and Bandler regarded the absence of ciliated epithelium as the most potent cause of tubal pregnancy. Abel and Freund, and others, advance the theory that infantile Fallopian tubes, whose lumen are too narrow to permit of the passage of the ovum, is a cause of tubal pregnancy. Tumors, such as polypi of the tubal mucosa or fibromyomata situated in the interstitial portion of the tube, may act as mechanical obstructions and cause the ovum to remain in the tube. Reports of such cases have been added to the literature in no small number. Atrophy of the tube due to hyperinvolution or lactation, which diminishes its motile and contractile powers, is considered a cause of ectopic fetation. External migration of the ovum is looked upon as a common cause.

The theory, that an ovum, originating in a diseased ovary, is discharged minus its discus proligerus the cells of which are supposed to be endowed with the property of preventing adhesions between the ovum and the tubal mucosa, is probably, "too phantastic" to be considered a cause of tubal pregnancy. Tubes diverticula has been given as a cause of this condition.

The author has found no reference as to predisposition to ectopic pregnancy in certain races. He has observed, however, that the Slav people are prone to this condition. This is merely a personal observation and is here stated only for what it may be worth.

In the light of our present knowledge of extrauterine pregnancy a diagnosis should be made in 80 per cent. of all cases before fatal rupture of the gestation sac and collapse of the patient takes place. Unfortunately the surgeon is not called to attend the case, in a very large per cent. of cases, until the so-called "tragic stage" has been reached.

There are two symptoms of cardinal importance in this condition: 1. Atypical menstruation, or metrorrhagia; and 2. Pain, typical in character.

Philander Harris puts the gist of this subject into a few words when he says, "When any woman after puberty and before menopause who has menstruated regularly and painlessly, goes four, five, six, eight, ten, fifteen to eighteen days over the time at which menstruation is due, sees blood from the vagina differing in quality, color, quantity, or continuance from her usual menstrual flow, and has pains, generally severe, in one side of the pelvis or the other, or possibly in the hypogastric region, ectopic gestation may be presumed."

The previous history of the patient is important. The marital history may shed great light on the case. It is essential to know whether the woman has been sterile or presents what is called "the one child sterility."

The vaginal bleeding is peculiar. It has a sort of slippery consistency, and at times a diagnosis may be made from the "feel" of the blood. The color of the blood is characteristic. In a majority of cases it is a maroon color. The blood may be tinged with a leukorrhea or, in rare instances, be of a bright red.

The findings in Douglas' pouch are also characteristic. The clotted blood causes a doughy mass which has a peculiar, crepitant feel. Oastler draws attention to the fact that, in cases presenting pelvic inflammatory disease, the uterus is usually retroverted; whereas in ectopic pregnancy it is, as a rule, anteverted. When the extrauterine pregnancy has advanced the uterus will, nearly always, be found displaced laterally away from the gestation sac.

The ovum or escaped blood act as foreign bodies and the tube, in its efforts to expel the foreign hosts, gives the symptom of pain. The pains occur at intervals and may extend over a period of several weeks before the fatal rupture. There may be an escape of blood into the abdominal cavity with no definite symptoms. Blood coagula and free blood may be found in the abdominal cavity in cases where rupture has not taken place as for instance in cases of tubal abortion. In some cases there is no history of hemorrhage or pain previous to a severe attack of abdominal pain followed by collapse.

In extrauterine pregnancy the breast signs are usually negative. The softening of the cervix is not so marked as in uterine gestation. The uterus is enlarged but does not correspond in size with the duration of the ectopic ovum.

In the nontragic stage the temperature and pulse are not very significant. When a sufficient amount of blood has escaped into the abdominal cavity there is a moderate elevation of temperature. one or two degrees, and an increase in the pulse rate. The tragic stage is marked by severe colicy pains, weak and rapid pulse, subnormal temperature, pallor of skin, vomiting, indeed by all the symptoms of shock. Not infrequently the patient is in a semicomatose condition from which she is easily aroused.

To quote Burrage, "No disease produces in the pelvis such a variety of conditions to be palpated by examinating fingers and hands as does ectopic gestation." Before rupture a diagnosis is comparatively easy. After rupture the diagnosis presents difficulties and is not so readily made.

If the symptoms present make us suspicious of the existence of a ruptured ectopic gestation, but that we cannot be positive of our diagnosis, the cul-de-sac may be incised with little risk, and if the peritoneal cavity reveals the presence of blood, a positive diagnosis of this condition may be made. One point must be kept in mind, however, when the surgeon opens Douglas' pouch—if the case is one of ectopic gestation, the larger operation of opening the abdomen must follow immediately.

We may say then, that a woman, previously regular in her menstruation, giving a history of having missed a period which was followed shortly by a peculiar vaginal bleeding, with pain and a growing fluctuating tumor painful to the touch, the diagnosis of ectopic pregnancy may be presumed.

It is still debatable as to what is the best time to operate in case of rupture. Some urge an immediate operation; others wait until the patient has recovered from the shock. The writer's rule is to operate as soon as the diagnosis has been made. If, however, the patient is in extreme shock with a low blood-pressure we do not operate. We Trendelenburg the bed and administer morphine. When the blood-pressure rises and the general condition has improved we open the abdomen. We do not, however, wait for the blood-pressure to return to normal. It has been our custom to practice transfusion, if required, and not infusion. The reason for this is obvious. For four years we have had no mortality.

Marvel reasons as follows: "Hemorrhage and sepsis are the cardinal symptoms of ectopic gestation. Sepsis is never a primary trouble. Its activity is engrafted upon a preexisting hemorrhage, which is the result of a ruptured gestation sac. Sepsis is secondary; hemorrhage primary. In order safely to combat them, it is necessary

to remove the underlying cause. To prevent sepsis is to prevent hemorrhage. When hemorrhage is evident, the only dependable means to secure control is to ligate the vessel approximate to the bleeding orifice."

Ovarian pregnancy offers symptoms different from tubal pregnancy. Uterine bleeding is not a constant factor. There is a history of amenorrhea. Hemorrhage in these cases is not as common as in tubal pregnancy. Pain is the rule, but it may be absent. To quote Ingraham: "The diagnosis presents the same difficulties as tubal pregnancy, and to my mind the differentiation is practically impossible. At best we can only suspect the condition." The writer has three uncommon cases which he deems of interest to report.

Case I.—Mrs. B., æt. thirty-two. Housewife. Family and personal history of interest. Married when nineteen years old. Sixteen months after marriage she gave birth to a child; three years later to another child. Both are still living. A year later she aborted at two months ovum. Two and a half years after this, she miscarried when five months fetus. The last miscarriage was the result of scarlet fever.

After the first abortion she had more or less of a profuse vaginal discharge. After the last miscarriage she was separated from her husband. She became twice pregnant thereafter and had criminal abortions performed.

The writer was called to see this patient on February 17, 1912. Believing herself pregnant, she consulted a physician who curetted her. After the curettage she suffered severe and increasing pain in the right lower abdomen. The uterine bleeding did not stop. The lower abdomen was tender. The uterus was slightly enlarged and a mass was left to the right of it. The vaginal examination was very painful. The temperature 99.3, the pulse 88. Hemoglobin 90 per cent. No blood-count was made. Diagnosis: Postabortal infection. The usual routine treatment in these cases followed.

For four days the temperature fluctuated between 99° F. and 100.4° F., the pulse ran from 84 to 102. The bleeding from the vagina continued but became less offensive. The abdominal pain and tenderness on palpation continued to increase.

Patient was sent to the Williamsburg Hospital. Shortly after her arrival the pain suddenly grew less, the pulse rose to 114 per minute, and the temperature dropped to 97.3° F. The patient was extremely prostrated. The writer called in Dr. H. A. Wade, and a diagnosis of a ruptured tubal pregnancy was made. The operation confirmed the diagnosis. The right tube was removed. The left tube was in poor condition and was removed. The uterus was adherent to the sigmoid and a loop of the small intestine. Fearing to light up fresh trouble, we did not free the adhesions. The abdomen

was closed without drainage. The patient made an uneventful recovery. Since the operation she had been far from well.

CASE II.—Patient aet. thirty-one. Housewife. Married eleven years. The writer first saw the patient when she was suffering from a mild attack of salpingitis. She began to menstruate at fourteen, and was regular until about six months after her marriage. The husband confessed having had gonorrhea three years before he married.

Two years after marriage the patient had a premature birth, due to a fall from a chair. Two years later she gave birth to a full term and living child. Three years later she miscarried a three and one-half months twin ovum.

Since the birth of her first child she has suffered from pain in her left side. Her menstrual type changed and ranged from twenty-five to thirty days. The duration of flow, two to six days. Pre and co-menstrual pain lasting from one to three days. She was decidedly neurotic. Vaginal and cervical smears negative.

May, 1913, the writer dilated the cervix, iodinized the endometrium, repaired a bilateral laceration of the cervix, and repaired the perineum. The cervical discharge was lessened, but the pain on the left side continued.

August 16, 1913, she consulted me stating she was "long over time." She felt sure she was pregnant. The uterus was slightly enlarged and fixed in a second degree retroversion. On August 18th I was sent for and found her suffering from severe pain on the right side in addition to the old pain on the other side. Upon digital examination the writer felt a tender mass to the right of the uterus, and still further to the right a harder mass, about the size of a small olive, which was also quite tender to the touch. At this time her temperature was 99.2° F. and pulse 84. She was kept in bed. The usual medical treatment for a salpingitis was carried out. The next night she began to bleed moderately from the uterus. The pain on the right side increased in severity and made a vaginal examination very painful.

These symptoms continued for four days. The temperature did not exceed 100° F., nor the pulse 96 per minute. August 24th the suffering was intense. Diagnosis: Ectopic pregnancy. She was transferrred to hospital.

While being prepared for the operation she suddenly went into collapse.

A few clots and free blood were found in the abdominal cavity. The sigmoid was adherent to the right side of the uterus as well as the tube and ovary. The left tube was inflamed. After freeing the adhesions the right tube was removed, the uterus suspended, and the abdomen closed without drainage. Recovery was uneventful. Patient left the hospital sixteen days after the operation.

This patient suffered from nausea which medication did not relieve, three days before leaving the hospital. The nausea continued for ten days after her departure. On two occasions there was morning vomiting. She believed herself still pregnant. On the twelfth day

she was taken with uterine pains and began to bleed per vagina. She said she passed some "pieces." An examination revealed a soft cervix dilated sufficiently to admit one finger. The cervix and vagina were packed with sterile gauze. The packing was removed the next day. The bleeding continued and that night she passed what looked to be placental tissue. Unfortunately, this was not saved for microscopic examination. No fetus was passed, and the bleeding stopped. There was a vaginal discharge of a brownish color but without odor. Seven days later she was about again.

This case is interesting inasmuch as the fetal sac was found and removed per abdomen. What passed from the uterus is a matter of doubt.

Case III.—A service case at Williamsburgh Hospital. Polish girl, aet. twenty-five. Factory worker. Removed to hospital in ambulance. Previous history unsatisfactory owing to fact that patient could not speak English. From what could be learned from and determined upon physical examination, a diagnosis of an unruptured right tubal pregnancy was made.

At the operation the abdomen was found full of blood coagula and a small amount of free blood. A mass in the right tube, measuring about three-quarters of an inch in all directions, was discovered. Left tube normal. Uterus freely movable. Right tube extirpated. Uterus suspended. Abdomen closed without drainage. The patient made a good recovery. The specimen removed was examined and proved to be a pure blood clot. No fetal structure could be discovered. The coagula and free blood in the abdominal cavity must have been expelled from the distal portion of the tube. A hematoma of the tube is not so rare as to excite comment. In this case the physical findings were those of an ectopic gestation.

THE CLINICAL AND PATHOLOGICAL FEATURES OF CHORIOEPITHELIOMA MALIGNUM.

With Report of Three Cases.

BY

AUGUST ADRIAN STRASSER, M. D., F. A. C. S.,

Assistant Surgeon, Woman's Hospital, St. Michaael's Hospital, Newark, N. J; Surgeon, Stumpf Memorial Hospital, Kearny, N. J., etc.

Arlington, N. J.

The report of a few cases of the condition under consideration, and the discussion of their clinical and pathological features, needs no apology. Its justification lies in the fact that there have been, after almost twenty years of investigation, only a few hundred cases of the disease described and discussed. Historically the condition is of great interest. One generation ago the disease was practically unknown; or, if recognized, was not differentiated from other malignant diseases of the uterus. When we realize that this is a concomitant of either the pregnant state, the blighted ovum or the cell inclusion in the embryo, where the host—be it the mother or the child—is in imminent danger of dissolution by the parasitic overgrowth of a physiologic cell formation, where no one can definitely state when the bounds of safety have been crossed, the subject becomes full of tragic possibilities and one whose existence must be always in the mind of the wideawake obstetrician, gynecologist and surgeon.

"Since greater watchfulness has been exercised toward the outcome of hydatid moles, postabortive hemorrhages and other pathological puerperal conditions, an increasing number of cases of chorioepithelioma have been reported in America. The comparative rarity of the disease permits few men to observe more than one or two cases in a lifetime. Many physicians have never seen it at all. In spite of this infrequency the high rate of mortality, incident to this form of tumor, makes it necessary for everyone who practises either gynecology or obstetrics, and this will embrace the great majority of all medical men, to be in a position to recognize the pathological condition at the earliest possible moment. (Franke)."

Despite the rarity of this disease, the literature has become

extensive and voluminous and in the confines of a paper of reasonable length it will be impossible to touch all the various phases of the subject. Aside from a brief animadversion to them such subjects as the metastases in various organs, inclusions in teratomata in males and females, and the polemics as to the origin of the component cells, will have to yield to more extensive discussion of more practical themes. It is, likewise, not feasible to review the various classifications and their rationale, as given by the earlier and the more recent writers on this subject, yet it will be necessary to follow step by step the historical evolution of our present teachings in the tumor under consideration, and to show, as A. L. Benedict (*Am. Med.*, April, 1907, IV., N. S. No. 4), has pointed out, "that the conception of chorioepithelioma has developed in logical and approximately chronological sequence along the following lines: 1, that hydatiform mole was something more than an unremoved placental mass; 2, that true tumors might develope in the uterus or at the site of an extrauterine pregnancy; 3, that these tumors were not merely caused by retained products of conception or by resulting inflammatory reaction acting as an irritant, but that the essential tumor cell was derived from the decidua; 4, that such tumors could not only extend but give rise to genuine metastases; 5, that similar tumors might arise so long after pregnancy as to show that the process could not be regarded as a slow but direct progress of a condition begun during pregnancy, but that there had been a latency of neoplastic cells; 6, that chorioepithelioma could occur as a primary tumor apart from the site of gestation, for instance in virgins and males; 7, that while, apparently, primary tumors developing in a woman, who could be suspected of having been pregnant, might be explained on the basis of latency and metastases, its occurrence in a young girl, and *a fortiori* in a male, could be due only to some form of teratomatous deposit."

History.—Chronologically our knowledge of chorioepithelioma starts with a paper by Marchand, although Sanger, Pfeiffer and others had described the tumor under the appelation of deciduoma and sarcoma deciduo-cellulare several years before. Later the works of Teacher, Riesel, Ruge, Eiermann, Fraenkle, Schmauch, Veit, Polano, Gaylord, Briquel, Franke, Ladinski and Ewing were the milestones in our progress in the elucidation of this complex subject.

Etiology and Histo-Pathology.—Under this heading we must enter a field where there are many unsettled questions, where often both disputants have equal rights to their opinions and where either hypothesis is equally defensible. To understand it correctly the

necessity of a casual review of the normal ovum implantation arises, and immediately there confronts us the dispute as to the interrelation of maternal and fetal tissues, the origin of the syncytium, and the mode of formation of the intervillous interstices. No matter however to which school one favors allegiance, many points are equally cogent in the other and up to the present this question is debatable. However the facts, as the microscope shows them, remain no matter how we interpret them; and, to my mind, the facts as I have been able to sift them below cover the field widely enough that the finer points awaiting settlement in the pathologists laboratory may be for the present disregarded and a working hypotheses be elaborated from the truths in both teachings.

For the adherents of the fetal origin of the tumor under consideration Bandler, in his very illuminating article, is able to lay down following theses: "Tubal and uterine ova furnish us with the following positive conclusions. 1. That the human ovum possesses an ectodermal growth of cells, the trophoblast, consisting of closely grouped cells. 2. When vascularized, a second external layer, consisting of plasmodial mononuclear and polynuclear elements results. 3. Elements of the blood circulating in the spaces and the lacunæ of the trophoblast contribute to the protoplasm of the syncytium. Among other elements, the secretion of the uterine or tubal epithelium may likewise contribute to the formation of syncytial protoplasm. At any rate, much of the protoplasm (but none of the nuclei), is of maternal origin. 4. On the villi and the membrana chorii the plasmodial cells form the outer syncytial layer, while the closely grouped cells beneath it furnish the single layer of Langhans. 5. The stroma of the chorionic villi is formed of mesodermal tissue in which are later found capillaries communicating with the umbilical vessels and containing fetal blood. Clear in almost every detail then, a trophoblast formation, consisting of an inner layer of separated cells and an outer or plasmodial layer such as is found in the placental development of animals, is found present in human placentation."

In the very early ovum such as described by Peters and Spee, this double layer of cells, covering the chorion and its villi are identified. From a cross-section of such a villus, the findings in hydatiform mole and the typical chorioepithelioma malignum, to reconstruct the successive histologic and pathologic steps does not consume a prodigious stretch of intellect or imagination. In its simplest form, the villus may be described in cross-section as consisting of a central core of jelly-like, myxomatous, embryological construction, with

transitional, formative blood-vessels, and held together by an ill-defined membrana chorii. Intimately connected with this and seated upon it is a definite and once seen, unmistakable layer of large well-defined polyhedral cells with a single nucleus of large dimensions. Over this is a multinuclear protoplasmic layer of cells, the individual bodies of which are very poorly or not at all defined but have the characteristic of a very intense staining with most stains. These two, the former called the Langhans cell, the latter the syncytial, while they are the normal constituents of the placenta, are the elements that go to make up in one way or another the hydatiform mole, the benign chorioepithelioma,the malignant chorio-epithelioma, the metastases in the various organs and in the teratomatous deposits, when different degrees of riotous hyperplasia occur. To understand their action we must become cognizant of the way both cells which make up the trophoblast are alleged to act and here we enter into the territory of dispute again. The upshot of it, however, is this. Histological examination of any section of chorionic implantation reveals the fact that there is always distinct evidence of the destruction of tissue in the environment of the chorionic villi and cells; Minot's "Hypertrophic degenerated trophoblastic cells" are in the interstices between broken-down muscular tissue and the free blood shows that there is an active destruction caused by their presence (Digestion, Bonnet terms it). This is sometimes markedly accentuated in ectopic implantation of the ovum; and in its pathological aspect the invasion of the trophoblastic layers, either as placentary polypi, as hydatiform mole or as true chorioepithelioma is easily understood. The disputed question arises from the fact that something in the normal mother evidently holds this invading power of the trophoblastic cells in check and the assumption of some form of protective force in the tissue of the host becomes reasonable. This may be a syncytiolysin or some other function in the mother's body that overcomes this proliferative tendency of the trophoblastic cells of the fetus. For Marchand points out the normal "transit" must cease with the death or blighting of the ovum or the tearing away of some of the chorionic villi and thus the normal metabolism and growth of the cells are violently disturbed. What follows is that the epithelium which shows great power of independent growth at all times, continues to be bathed by a large amount of blood in the maternal sinuses; proliferation continues unabated and the cells increase their normally inherent destructive power on the environing muscle tissue. There is probably also a partial reduction on the part of the mother of her

power to curb this activity. The puerperal tissue is sodden with serum and the muscle fibers are pushed apart and partly destroyed, and the interstices offer much more unusual facilities for the growth of the villous columns than the tough and close-grained tissue of the nonpregnant womb. The question therefore arises why does not every ovum produce the destruction of its host and is answered by the fact that not only has spontaneous healing by destruction of the invading cell masses been observed but Veit claims to have found antibodies in the pregnant woman's body and based on this Schmauch explains the cessation of the proliferative tendencies on the basis of the side-chain theory of Ehrlich. However, whatever the reason, it is certain that while usually the normal implantation of the ovum is safeguarded by something that limits the extensive proliferation of its trophoblastic cells; yet when the ovum is blighted or for any other reason the trophoblastic layer becomes luxuriant and cells run riot through normal tissue, then the hydatid mole or the chorioepithelioma results; and when it takes on metastatic tendencies, is washed by the blood stream to the lung, liver, brain or vaginal tissues, it may grow in these other organs and leave nothing to show its original site, then the adjective malignum can be justifiably added.

For clinical results have forced us to differentiate between benign and malignant chorioepithelioma and the pathologist's classification has had to submit to the same differentiation, based on clinical findings.

Ewings classification will be gone into later as the one that takes cognizance of this fact; Schmauch's may be mentioned here as a working basis for description. He classes all cases as "typical" chorioepithelioma where the tumor "presents a well-defined structure which resembles the epithelial cover of the villi in early stages of placentation; Langhans' cells, permated and surrounded by syncytium and plasmodial masses resembling the syncytial buds of the villi;" his second, a "atypical," class of chorioepithelioma, as he says better termed, deciduomata is mainly differentiated by the presence of the decidua cells in preponderance. This looks the more destructive and of greater malignant tendencies in its effect on the maternal tissues yet withal it is less treacherous than the typical form. The third class is practically a "transitional" one, where the syncytial cell predominates in groups with occasional Langhans' cells interspersed. Histologically all the types impress us with their malignant possibilities but the more frequently we have the reports lately of recoveries with and without

operative interference the more it almost forces us to differentiate between normal and abnormal trophoblastic activity in every, even the normal appearing ovum.

As was said above, the classification of the trophoblastic tumors under consideration, as given by Ewing, has the triple advantage of, first, offering a working pathological classification; second, the findings as grouped admit of a prognosis based on good reasoning, and, third, therefore serve as a rationale for conservative or radical operative interference. It may be well to briefly review his views. First he recognizes the important relation of the hydatid mole to the choriomata; and based on the amount of the proliferative tendencies exhibited by the cells of the two layers of the trophoblast, the prognosis and the indications for more radical steps are formulated. All in all, however, the course in the condition is favorable. The second group includes the typical chorioepithelioma of Marchand. This he calls "the mildest type of a genuine neoplastic process in the chorionic structure"; and names it from its histological characteristics and its distinguishing clinical features chorioadenoma destruens. Reproducing in an orderly fashion all the structures of a normal villus; extending into the broad ligament and into the vagina, not given to general metastases; constantly characterized "by orderly branching buds of vacuolated syncytium and sharply defined Langhan's cells which show no pronounced metaplasia nor morphological variation from the normal type." He justifies the distinction of this group for practical reasons; inasmuch as it offers a more hopeful prognosis than any other form of choriomata. The third group is what Marchand called the malignant chorioepithelioma but which Ewing prefers for various cogent reasons to call the chorio-carcinoma. Here the orderly neoplastic condition of the tumor constituents is lacking, and "very extensive proliferation and pronounced metaplasia of Langhan's cells and syncytium" is the rule. "The tumor cells in this group exhibit a remarkable capacity for independent growth apart from villi, show an advanced metaplasia and in the metastases a striking loss of differentiation. They grow diffusely, failing to show the orderly arrangement or polarity of the milder forms of choriomata." Their histological characterization and their gross characters are quite different from the chorioadenomata." "The tumors in the uterus are comparatively small, or may even be missing in the uterus, but numerous metastases are found in the lungs, spleen, brain and other organs." "The prognosis must in these cases always be unfavorable and in the great majority prove fatal in spite of early operation," although a few have been

known to recover. The fourth group, corresponding to Marchand's atypical chorioepithelioma, he gives what seems to me a much better name, viz: syncytial endometritis. The distinctive features of this variety is the "absense of the actively proliferating syncytium and Langhan's cells, but an extensive infiltration of the uterine muscle and the sinus walls with a large number of large or giant mononuclear cells, derived from the syncytium." "When they are exclusively present and chiefly within the muscle, they constitute the atypical chorioma of Marchand." These cells are looked upon as a normal concomitant of every pregnancy, most marked in the early months up to the sixth month "but may be entirely missing in the uterus at term (Meyer)." Clinically "in the gross the uterus is much enlarged, often to greater dimensions than are seen with other forms of chorioma"; the growth arising either from a large area, involving most of the endometrial surface, or from only a small area of the mucosa. "It may produce one large intrauterine mass or more often appears as irregular globular masses surrounding the enlarged uterine cavity." It is doubtful if it ever perforates the uterus or that "general progressive metastases ever occur from this type of chorioma." When, however, the process under consideration takes on more of neoplastic phase, the group can then well be termed syncytioma, combining the various transitional types met with between all the various groups above identified. "For," says Ewing, "it is probable that there are all gradations between choriocarcinoma or adenoma and syncytial endometritis, and that the transition is marked by progressive increase in the proportion of syncytium and decrease of Langhan's cells, while at the same time the proliferating syncytium is gradually replaced by syncytial wandering cells."

The biological classification of the chorioepitheliomata offers less difficulty. As stated before, Sanger and Pfeiffer looked upon the condition as an aberrant sarcoma; and the title, deciduo-sarcom and sarcoma deciduo-cellulare were kept in Germany from 1888 to 1893, when Gottschalk from a more careful study decided to call the tumor sarcoma chorio-cellulare; a year later Fraenkel, finding nothing of a sarcomatous nature in the stroma of the tumor and that it was purely of epithelial origin, contended that the tumor was a sarcoma. Marchand's classical work in 1895 gave it the definite name of chorioepithelioma malignum, to describe a tumor which "originated at the point of placental insertion from the syncytium and Langhan's cells of the chorionic villi; and consists of interwoven masses of cells and protoplasmic masses, containing neither connec-

tive tissue substance nor blood-vessels, but often areas of necrosis." (Pierce.)

In 1896 the committee appointed by the Obstetrical Society of London, to decide the status of Marchand's tumor reported categorically that it was a sarcoma, and this attitude did much to hinder the progress in the study of this tumor; and Veit as late as 1902 contends that the cells called Lanhang's cells are decidual cells which have undergone a sarcomatous degeneration and that the syncytial elements may be formed from other cells or tissues when influenced by pregnancy and are not necessarily derived only from the chorionic epithelium. However, Teacher's valuable contribution in 1903 served to straighten out the contraversialists and the valuable work of Webster has added many cogent arguments to the settlement of the question. But at the end of all, it remains to follow the classification of Adami, which recognizes the condition as a new pathological entity and places the hydatid mole and the chorioepithelioma in the class of teratogenic blastomeres, acknowledging the constituent cells to be derived from another individual, therefore as truly parasitic as the teratomas and terato-blastomas.

As to the etiology, the figures gathered by Pierce combining those of Strogonowa, Spencer, Pick and McKenna show that in a total of 176 cases, chorioepithelioma followed hydatid mole 77 times, normal labor 36 times, abortion 20 times, and tubal pregnancy 4 times. This is about the proportion later writers find; as embodied in its definition then, chorioepithelioma usually finds its greatest etiologic factor in the pregnant state; of course, this does not take in those cases where it is claimed there is blastomeric inclusion in teratomatous deposits in the bodies of males or of such females where pregnancy can be totally excluded. Concerning this we shall speak briefly later.

All varieties of anatomic distribution of these tumors have been described. The most frequent, of course, are those where the site of the tumor is limited to the uterus and adnexa; and in Ewing's classification above, the usual findings have been detailed. To illustrate by typical case, I have selected from the American cases collected by Frank the cases of W. McDonald (*Am. J. Gyn. and Obst.*, xix., 205, 1901) and that of L. J. Ladinsky (Amer. Jour. Obst, xlv, 465, 1902). The first was a woman of thirty; para-iii; last pregnancy five months before; was supposed to have miscarried, now at second month; three weeks later curetted for bleeding; again curetted one week later and "placental tissue" removed. One week after last curettage a severe hemorrhage followed; a pedunculated vaginal tumor was noted;

the os was patulous, and a conical growth projected from the fundus. Death from hemorrhage. No autopsy. The tumor tissue showed typical chorioepithelioma.

The other case occurred in a woman of nineteen, primipara, after delivery of hydatid mole, repeated curettages failed to stop the bleedings. The uterus was felt enlarged, the os patulous, bilateral ovarian cystomata the size of a fist; abdominal panhysterectomy. The uterus contained a nodule of typical chorioepithelioma. These will serve as type cases for this anatomical division of the clinical manifestations.

Rather more baffling are the cases reported where the vaginal nodules are the first cause of the patient's seeking medical attention; and where the uterine condition may be nil even. As a type of this sort of condition the case of Hicks (*J. Obst. and Gyn. Brt. Emp.*, vol. vii, Aug. 2, 1907) is chosen. A woman, twenty-eight years old, para-iii., had amenorrhea for seven months; then passed a hydatidiform mole and a five-month fetus. A month later there was a blood-stained discharge. The uterus was found subinvoluted and there was a tumor in the vagina, which on removal proved to be a typical chorioepithelioma. Five months later another was again removed from the vagina and then a third in six weeks. This recurred soon after and the patient died eleven months after the expulsion of the mole. At autopsy the uterus had no growth in it; there was a slight metastasis in the right lung. Ovaries contained lutein and blood cysts. Hicks concluded that the vaginal growth arose from the epithelium of embolic villi, spreading along perivaginal spaces.

As was mentioned before in Ewing's classification, certain classes of cases of chorioepithelioma seem to possess a remarkable malignancy; sparing practically no vital organ from metastatic deposits. For instance, in the typical case reported by Anspach and Alburger (*Am. J. Med. Sci.*, March, 1908), M. H., aged thirty-one years; para-vii, was admitted to the hospital February 11, 1905. Her youngest child was two years old. For the past three weeks she had had a white discharge streaked with blood; for the last week this was dark red and of foul odor. She passed many clots. She was emaciated, anemic; her hemaglobin equalled 50 per cent. Her uterus was the size of a three months pregnancy. Digital and instrumental removal of what was taken for placental tissue but on histological examination proved to be a typical chorioepithelioma. Panhysterectomy was done. Death after six weeks. At autopsy metastases were found in the pelvic peritoneum, in the pelvic, lumbar, bronchial

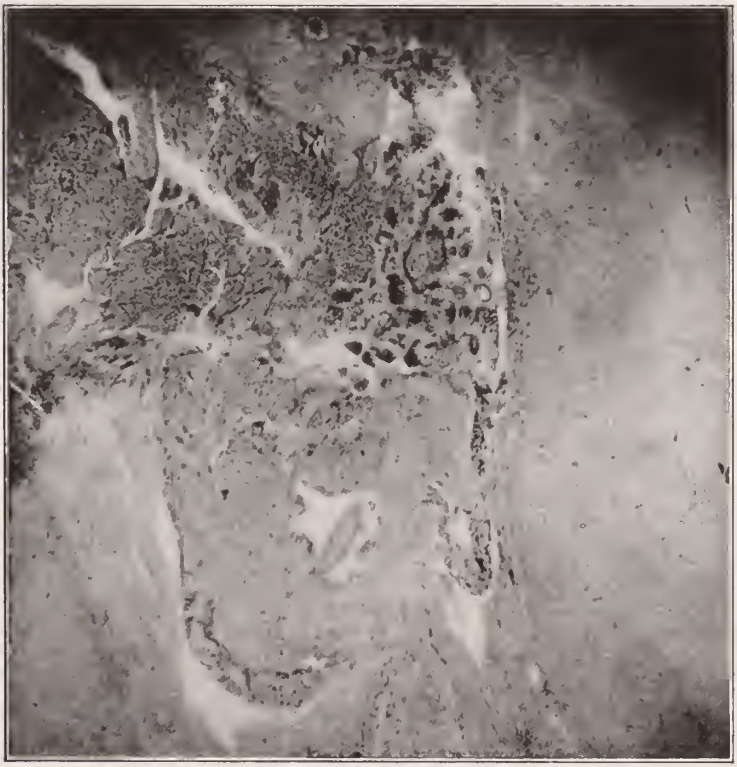
and retroperitoneal lymph nodes, in both lungs, the pleura, kidneys, liver, pancreas, and in the left pectoral muscles.

It must not be forgotten that hydatid degeneration has been described in ectopic gestation and naturally there is, while the condition must be rare, no absence of reports of chorioepithelioma in tubal pregnancy. The classical case is that of Vossmer (*Path. Anat. Arb. Festschr. f. Orthop.*, 237, 1903) who reported a case where a vaginal metastasis first attracted notice to the condition existing in the abdomen. Naturally cases such as these, simulating and being diagnosticated as ectopic gestation, are also recorded.

There remains to briefly discuss, that class of cases, the description of which for a time served to muddle the histopathology of this tumor most effectually. Pick reported finding in a girl of eight and one-half years of age, who had never menstruated, a chorioepithelioma, proving thus that this may occur in teratomata of the female as well as in the male, for typical chorioepitheliomatous masses had been found by Rosthorn in teratomatous brain tumors in a thirty-year-old man, at operation. While at autopsy later metastases were found in the retroperitoneal lymph glands, lungs, liver, and kidneys; the testicles were without any neoplasia. Based on such findings, Schlagenhaufer and Huebl argued that there was no such specificity to the chorioepithelioma which Marchand had described; but Riesel successfully combatted this by showing that in reality the malignant chorioepithelioma of the pregnant or parturient woman, and the choriomoid proliferations as found in such cases as Rosthorn's above could not be identical in any way and certainly not as to genesis. He identifies the more or less extensive chorioepitheliomatous deposits as part of a teratoma, in which search would reveal evidences of the other layers; and when only the ectodermal layer can be identified, it is still probably a teratomatous growth in which the one tissue constituent has crowded out all the other layers and had a one-sided development only. This would be accounted for by a growth and inclusion of fetal ectoderm, which might cause a pure teratoma, or by excessive overgrowth in one direction of a totipotential cell, the tumor resembling chorioepithelioma; and would not necessitate the assumption of a distinct inclusion of trophoblast cells in the growing fetus. In other words, Pick (*Berl. Kl. Woch.*, 1902, v, 1198) has well differentiated between the conditions, by saying, "chorioepithelioma and hydatid mole are to their hosts in the relationship of descendants; the chorioepitheliomata found as teratomata are to their hosts in a consanguineous relationship."

Before touching on the question of diagnosis, the clinical histories

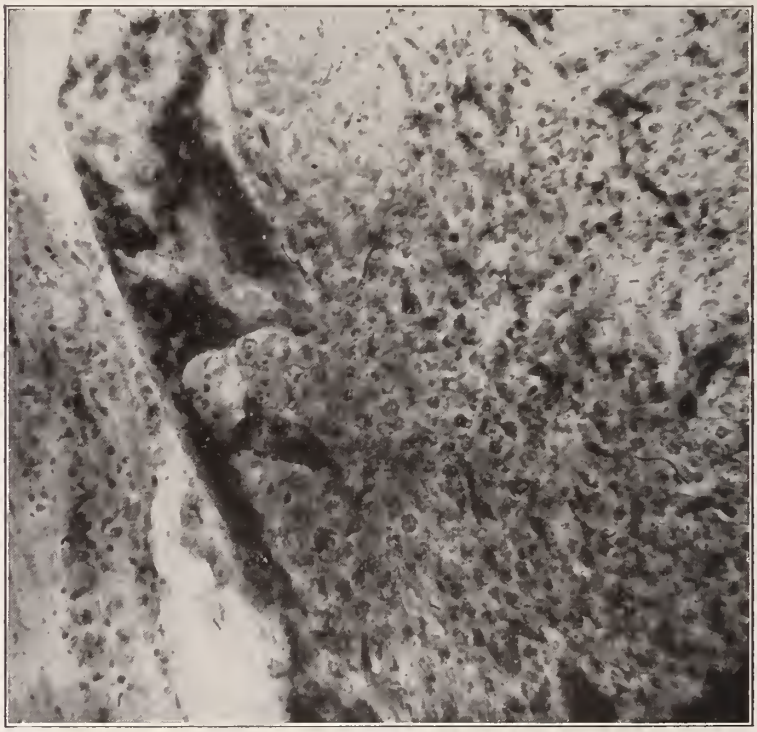
Cross-section of uterus and tumor mass in Case I. Note smaller forms below main tumor.



Low-power photomicrograph of Case I.

of the three cases I wish to report in this paper may help to bring out the salient features upon which the diagnosis of these cases is formulated.

Case I.—E. V., admitted to service of Dr. C. L. Ill at St. Michaels Hospital, July 6, 1908. She was an Italian forty years old and married. She had born four children at term and had had two miscarriages, the last one a two months' fetus, in March previous. She flowed interruptedly to June 13, when she was curetted; but



High-power photomicrograph of Case I. The abundant syncytial masses are well shown here.

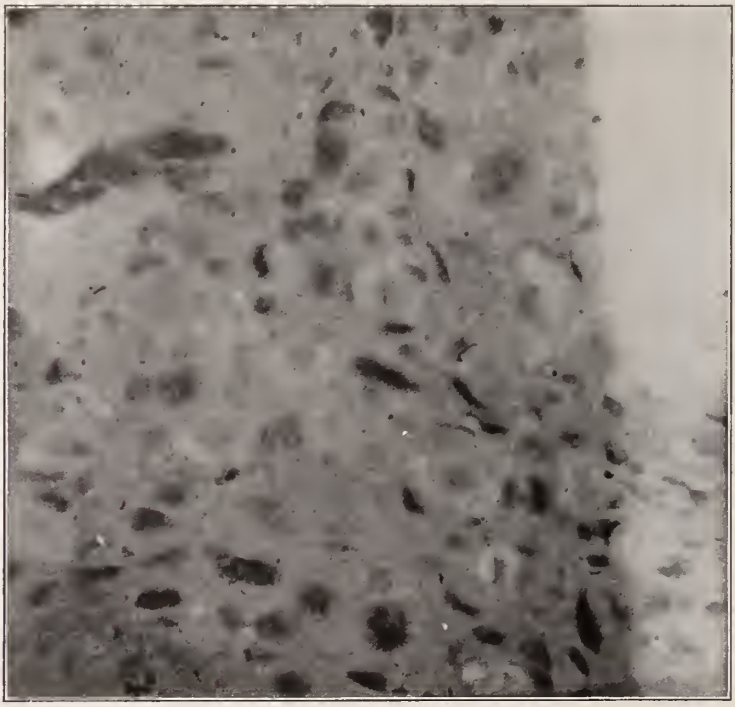
after a few days started to flow again, so that when curetted on July 4, once more, and large masses of tissue simulating placenta were removed, the diagnosis was made and corroborated by the pathologist, chorioepithelioma malignum. Consent for a panhysterectomy was gotten and July 31, I operated on her. She did not survive the operation. Autopsy refused. Description of tumor: Uterus was about the size of a four and a half months' pregnancy. The fundus was practically eroded through by the tumor mass. Cross-section showed a large globular mass in the wall of the uterine fundus, softish

CASE II. Note typical lutein cyst of ovary.

Low-power microphotograph of Case II.

in character and purplish red in color with patches of yellow here and there. The actual measurements of the uterus were 8 cm. × 8 cm. at the fundus and 17 cm. from cervix to fundus. The main tumor mass had a diameter of 7 cm. The accompanying photographs and photomicrographs show the character of the tumor and the pathologic elements of the tissue composing it.

Case II.—M. R. was admitted to the service of Dr. Chas. L. Ill at St. Michaels on Feb. 7, 1911. She was nat. U. S. A.; forty-two years old, married for thirteen years, had had three children at term and one miscarriage, at two months, last November. She had been ill since that time. Her previous health had always been good.



High-power photomicrograph of Case II.

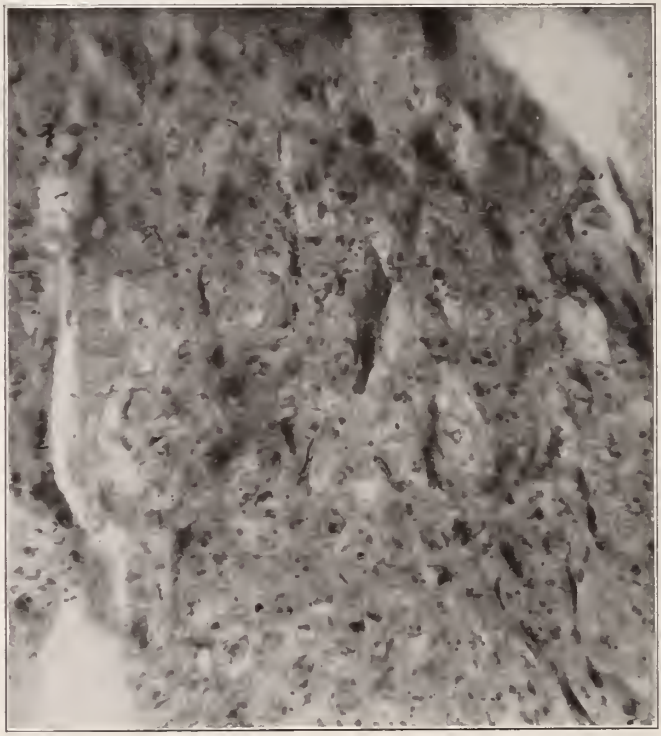
Two weeks after her abortion because of constant flowing she had been curetted; as she started to flow again three weeks after she was again curetted. Four weeks after this curettage she began to flow again and has been flowing for the past four weeks preceding admission. Examination showed moderately enlarged, soft and boggy uterus. Hysterectomy advised and accepted. I removed uterus and adnexa *en masse*. Description of tumor: Uterus measures 6 cm. × 4 1/2 cm. at the fundus and 8 cm. in length. The tumor mass of chorion-like tissue in the fundus about the size of a walnut was also of that shape. Right ovary about the size of a duck's egg

Case III. Typical choriocarcinoma.

Low-power microphotograph of Case III. Choriocarcinoma.

and containing typical lutein cyst. Microscopically the tissue was typically choriocarcinoma. The patient recovered nicely from the operation and is living at present.

Case III.—Patient an inmate of All Souls Hospital, Morristown, N. J. whose history I cannot give entirely, as requests for it have been ignored. Briefly as I remember it, it is as follows. Dr. C. Ill, while operating on another patient at the above hospital, while I assisted him, was invited to go through the ward; while he was at one end of the ward and I at the other, the history was detailed to us by two members of the staff and from our previous experience we



High-power microphotograph of Case III. Choriocarcinoma.

both made the probable diagnosis and Dr. Ill was thereupon invited to operate on the patient, which he did a few days later. The patient following a full-term labor several months before had never ceased bleeding in spite of curettages at various times. Total hystero-salpingo-oophorectomy was performed. Description of tumor: Uterus slightly enlarged, 8 cm. × 6 cm. at the fundus, 10 cm. in length. In left cornu and fundus the characteristic placenta-like mass, 3 cm. × 6 cm. Adnexa normal. Microscopically typical choriocarcinoma. I am much indebted to Dr. C. Ill for permission to operate on the first two cases and to report here all three of them.

To unify these various points into a system of symptomatology upon which to base diagnosis, judging by the great diversity of phase which all the foregoing has only hinted at, is rather a large undertaking. Still with modifications both ways, salient features predominate and we must keep them in mind when the case presents itself. Of course the last resort is the microscope, the findings with which determine absolutely the existence or non-existence of a malignant neoplasm. To that we shall recur, in a minute. But the clinical points on which the diagnosis of this neoplasm rests are also fairly distinctive. First, the neoplastic growth occurs only in a woman who has been pregnant; how recent the pregnancy or how long before is rather a difficult question to answer, for many cases are reported in which a varying number of years have elapsed between the pregnancy and the tumor. However, the danger is proportionately greater the more recent the pregnancy, its termination in an abortion with retained placenta; and greatest after a hydatid degeneration of the placenta. Second, after such interruption or degenerative change of pregnancy, the occurrence of persistent hemorrhage, based on which curettages are so performed, but apparently in vain, for there is really never a total subsidence of the bloody discharge; where the uterus is flabby and enlarged and the cervix is patulous, giving the feel of subinvolution, there is cause for apprehension in the direction of the difficulty under consideration. Third, the anemia and the cachexia are nearly always distinctive and, as several of the writers have pointed out, the anemic facies is not only that of the severe hemorrhagic depletion of a neglected abortion, but is rather the cachectic look of those dying of malignant disease. Fourth, either consequent upon or concurrent with such a pregnancy, metastitic growths in the lungs, vagina, brain, kidneys or liver may be the only symptomatic evidence of something wrong; so that a cough with bloody mucus, or characteristic nodules in the vagina are distinctive enough to make a positive diagnosis possible. In the vagina, the nodules are characteristic in color (purplish red) rather friable, and when ulcerating giving off a sanious, ichorous fluid, with necrotic odor; they have a typical malignant "look."

In answering the question as to incidence, we need only point to the corollary of pregnancy as an essential and the age corresponds to the child-bearing period. Stone says (Amer. Jour. of Obst., Oct., 1907) that the youngest case reported was, in a girl of seventeen, by Ahlfeldt (*Monatsch. f. Geb. u. Gyn.*, 1897, i.); Champneys reports it in one of eighteen (*London Practitioner*, 1896). The oldest case

reported was in a woman of fifty-two, by Hollemann (quoted by Marchand, (*Zeitsch. f. Geb. u. Gyn.*, 1898, i).

Ladinski reported that the elapse of time between the termination of preganncy and death as it occurred after mole, labor at term or abortion were from three days to six years in mole, and two weeks to one and one-half years in abortion cases, and from one to nine months after labor at term. The average was from four to six months.

Treatment.—The only treatment that need be discussed is operative. When there is evidence of hydatid mole, the uterus should be emptied immediately and the most painstaking microscopic examination of the tissue made. If there is any evidence of malignant proliferation, one must agree with Neumann that it is really true conservatism to extirpate uterus and adnexa *in toto*. The same holds true if after an abortion or even after normal labor there be inexplicable bleedings. It is interesting in this connection to see that Deaver in his recent paper at Atlantic City, reported finding in a hysterotomy a small chorioepitheliomatous area and promptly extirpated the uterus and tumor.

ABDOMINAL SECTION WITHOUT THE USE OF RETRACTORS.

BY

GEORGE CHANDLER, M. D., F. A. C. S.

In developing a surgical practice in a smaller city, the writer has been obliged to endure many hardships, not so much in the matter of transportation as in the actual paucity of equipment and lack of assistance.

Hysterectomies, appendectomies, gastrotomies, cholecystomies, in fact practically every abdominal operation even for multiple gunshot wounds of the intestines, have been performed with no other assistance except the family doctor and he was the anesthetist. This condition does not obtain now, but the habits engendered during these trying times have remained.

Obviously, if you operate without an assistant, you cannot use retractors unless of the self-retaining variety. The writer was never very successful in their use, finding them cumbersome, elaborate and, in the majority of cases, hard to adjust; particularly if the patient is restless and strains under the ether, which is the rule with a poor anesthetist.

Operating without retractors has become a uniform practice for this reason, and the more this method is used, the more I am convinced that it is, in the majority of instances, the best method. In support of this idea, let me present the following facts: When retractors are used, the incision must be larger than is really necessary, for it must accommodate not only the hand of the operator, but the hard, unyielding surfaces of the retractors themselves. The amount of time wasted in adjusting them redounds to the disadvantage of the patient. They are rarely held just right and have to be constantly readjusted as the operation proceeds. The operator himself, when retractors are used, gets into the habit of doing his work deep in the cavity, and does not bring the structures well up into the incision; on this account he becomes almost a slave to his eyes, and a surgeon who cannot see more with his hands than his eyes is a slow and tedious worker.

When mechanical work of importance is to be done, the structures are usually mobile and, if properly manipulated, can be brought well up to the surface. It is remarkable how easily with a little

practice structures may be brought up and outside the wound. If there have been tremendous inflammatory processes with infiltration, and when the tissues are edematous and will tear easily, nothing but the simplest kind of work should be done. It is then mostly a case of drainage.

If retractors are used, two or three and sometimes even four assistants are necessary. How much greater is the chance of infection when several pairs of hands must be sterilized! This to my mind is of great importance. Particularly is this true when we operate in private homes, and in smaller hospitals in the country, where the dangers from the unclean hands of too many unskilled assistants, is incalculable. This is obviated, if the operator can do his work with one trained assistant and no retractors.

The pressure by retractors against the raw surfaces of the wound is, to my mind, the greatest of all objections to their use. The average laparotomy is from twenty to forty-five minutes in duration. For this length of time there is kept against these raw surfaces a pressure of a good many pounds. There must, in the very nature of things, be a very considerable traumatism to the tissue which is far-reaching in its after-effects to the healed wound. The nerve supply to the abdominal muscles is so bruised by this long-continued pressure, that a certain amount of inflammation will occur, and as a result trophic disturbances will manifest themselves later in weakened muscles culminating in postoperative hernia.

There are instances where a retractor would seem to be almost a vital necessity, but a soft sterile towel, if properly used, will give even better results, especially when the Trendelenburg or the reverse Trendelenburg position is used.

The absence of postoperative hernia for the last nine years in the writer's nondrainage cases, many of them done under the most trying circumstances, caused him to seek some logical explanation of this result. The fact that during these years no retractors have been used in a varied surgical practice, averaging 200 laparotomies a year, seems to have some connection with it; before this time, the writer had his share of hernias and their attendant worries.

It has always seemed to me that too much stress was placed upon the opening and closing of the abdomen. The lesion and the work to be done inside are surely the main points of the operation. Therefore a quick entrance and a simple and rapid closure are of the greatest advantage to the patient. All of the above cases were closed as follows: One continuous long strand of No. 2 plain catgut suffices for the entire closure, whipping together first the peritoneum,

making an ectropian where possible, then the muscle, then the fascia, and lastly a subcutaneous suture for the skin. The subcutaneous suture allows a slight serous exudate, especially in fatty abdominal walls to drain. There is very little traumatism in this kind of suture, while the coarser sutures such as chromic gut and interrupted sutures with their knots, act as foreign bodies and become irritants.

Four essential points are necessary for primary union: Cleanliness, apposition, a dry wound and immobility of the tissues. Cleanliness is best obtained under the ordinary aseptic routine with as few assistants and as few instruments as possible. Apposition is best secured if the tissues are not distorted by bruising and when brought together in the simplest manner that meets the requirements. Complete hemostasis is essential. The last requirement, immobility, is obtained by a strip of adhesive plaster 6 inches wide, which completely surrounds the patient's abdomen. This makes a solid binder which holds the abdominal walls and the wound immobile. This is exactly the same principal as strapping a sprained ankle. The ankle would slip under an ordinary bandage, but not so with the encircling adhesive binder which sticks and holds the parts firmly.

In recapitulation, we see the following advantages in doing abdominal work without retractors.

1. Smaller incisions.

2. Avoidance of bruising the tissues and injuring the abdominal muscles.

3. A lessened danger of sepsis by fewer assistants.

4. The increased chance of better work by the bringing up of the tissues into the wound.

5. The training of the operator's hand, the tactus eruditus, resulting in a tendency toward simplicity in technic which, after all, should be a surgeon's highest goal.

VAGINAL CESAREAN SECTION FOR ECLAMPSIA AND OTHER CONDITIONS.

BY

IRVING W. POTTER, M. D.,

Buffalo, N. Y.

In advocating vaginal Cesarean section for the treatment of eclampsia, it is not the purpose of this paper to hold that it is the *only* treatment in this condition; but, admitting pregnancy as the exciting cause of the convulsions, the writer maintains that this method of emptying the uterus is the quickest and best, after the third month of pregnancy.

To Peterson of Ann Arbor, probably, belongs the credit of bringing this operation fully before the profession in this country. It is not my purpose to burden you with a large array of statistics bearing upon this subject, but more to lay before you the indications and technic for vaginal Cesarean section for this condition, and to report a series of fourteen cases treated by this method.

We must all agree that the tendency of obstetric procedure has been conservatism; the least amount of interference has been the key-note of all the teaching. It seems as though the results obtained by the early operators has made such an unfavorable impression upon the profession, that the progress in obstetrics has been slow—much more so than in any of the other specialties.

Whatever the cause of eclampsia may be, all authorities seem inclined to agree that the prognosis improves after the uterus is emptied. If that be the case, then the question arises, what is the best method of emptying the uterus? Is it manual, instrumental, or bag dilatation? The writer prefers vaginal Cesarean section, or vaginal hysterotomy.

The indications for the rapid emptying of the uterus are briefly stated as follows: Eclampsia with or without convulsions; central placenta previa; accidental hemorrhage; prolapse of cord; dangerous heart condition in mother; advanced tuberculosis in mother, and hemorrhages, due to malignancy or hydatid mole.

It is my purpose to report cases of eclampsia, central placenta previa, accidental hemorrhage, and of valvular heart lesion, in which the uterus was emptied with satisfactory results with the aid of vaginal

hysterotomy. Those who have dilated, manually, a hard unyielding cervix know what a long tiresome unsatisfactory process it is. I do not believe that the cervix under these conditions can be dilated without tearing. The operator in attempting to dilate a rigid or diseased cervix, manually or with instruments, simply tears this organ on one side or the other. Severe hemorrhage is the results, which further weakens the patient and opens new avenues for infection. Then, too, the element of time, which is so important, must not be lost sight of.

How different is the method of vaginal hysterotomy? It is a clean surgical procedure, requiring few assistants and not necessarily a hospital operating room. It is an operation that can be performed anywhere and at any time, with no more danger to the patient than there is in doing a version. The preparation of the patient is the same as for any other vaginal operation: An enema of soap and water; shave the external genitalia thoroughly; sterilize the vagina with soap and water and irrigate copiously with normal saline solution, and empty the bladder with the catheter.

The patient is placed in the lithotomy position on a table well padded and covered with a Kelly pad. Her legs are supported by two assistants or, if no assistants are at hand, are held well flexed by an ordinary leg-holder. A weighted speculum is then introduced into the vagina; and, if assistants are at hand, two smaller specula are used to draw the sides of the vagina apart. This, however, is not absolutely necessary, but it facilitates the work of the operator. Then two single-tooth tenacula forceps are hooked into the anterior lip of the cervix, which is then drawn down as far as possible, and firmly held there. Two strands of silkworm gut can be used for the same purpose. Then a transverse cut is made with a knife, or pair of scissors at the point of union of the cervix and anterior vaginal wall. This opening may extend on either side as far as is needed. The depth of the incision extends to the point where the tissue peels easily with a piece of gauze. At this point there is no bleeding. The bladder is thus separated and pushed upward and out of the way. Thus the anterior lip of the cervix and bladder are entirely separated. If more room is required, the posterior cervical lip is treated in the same manner, separating it from the rectum. There is, usually, very little hemorrhage. Then with a long pair of straight scissors a cut is made in the median line along the anterior lip of the cervix, extending up as far as needed to introduce the whole hand into the uterine cavity. The posterior lip of the cervix can be treated to a similar incision if

more room is required. It is better to have two incisions than to be cramped for room. The membranes are then ruptured and the child delivered with the aid of the forceps or version. The placenta and membranes are delivered immediately.

The repair work is done in the reverse order beginning in the upper angles of the uterine wound. Chromic catgut No. 2 in a curved needle placing the sutures, interruptedly or continuously, down to the external os. The transverse incision is then closed with a continuous suture of plain catgut. It is well to provide drainage in this incision. To prevent the formation of a hematoma. The patient is then put to bed, and treated in the usual manner following operations in the vagina.

What is the danger to the child in this procedure? No more, nor less, than that which depends upon the existing toxemia, or any other condition which demands the operation.

What are the dangers to the mother? The principal danger appears to be injury to the bladder, either when the incision is made or by subsequent sloughing. In 530 cases of vaginal hysterotomy Peterson found nine bladder injuries. Hemorrhage should not constitute a serious complication. The danger of sepsis always exists, but in careful hands, it is reduced to a minimum. The effect of the operation upon succeeding childbirth is somewhat uncertain; however, no serious results have been reported so far. I wish to report the following cases:

Case I.—Mrs. G., German, aet. forty-one para-x. Duration of pregnancy, eight months. Saw patient in consultation with Drs. Frank McGuire and Geo. B. Stocker, June 21, 1911, with a view to terminate her pregnancy on account of chronic heart disease. Patient's condition was alarming. She was unable to lie down; feet were badly swollen, and breathing difficult. We determined to wait till full term, if possible; but, after watching for one week, I was sent for again. Her blood pressure at this time was 220. On June 27, Dr. Stocker administered ether; and, with the assistance of one nurse, I delivered her in her home of a live baby with the aid of vaginal Cesarean section. Duration of operation, twenty minutes. The patient died two months later of heart disease.

Case II.—Mrs. W., German, aet forty, para-vi. Duration of pregnancy, eighth months plus. Patient was seen at 1 P. M., November 9, 1911. She had had "several" convulsions in the morning. No dilatation of cervix. We took her to St. Mary's Hospital at 4 P. M. Had convulsions while on the way there. Vaginal Cesarean section was performed at 5.30 P. M. Child lived. Patient had five convulsions during the following night, but made a good recovery. This was the second time I had attended this woman in eclampsia.

Case III.—Sophie C., unmarried, aet eighteen. Entered St. Mary's

Hospital at 2 A. M., February 3, 1912. History of headache, loss of vision, and convulsions during previous day. Urine loaded with albumen. Vaginal Cesarean section was performed at once. Male child was delivered alive, but died shortly after. This patient continued to have convulsions, and died at 1.30 P. M. Consciousness never returned during the intervals of the attacks. According to Dr. Zinke, the prognosis in these cases is always bad.

CASE IV.—Julia M., married, aged nineteen. Full term, pregnant for first time. Saw her February 15, 1912, with Dr. James P. Barr, at 10 A. M. The day before she had eight convulsions. The day I saw her, she had had four convulsions. Urine scanty and boiled solid in tube. Vision poor and headache. Taken to St. Mary's Hospital, February 15, where I delivered her of a live child. Operation and repair took forty-five minutes. She was given croton oil, hot-air baths, and fluids. She did well for three days, when she had one convulsion. No more after that, and mother and child left hospital in good condition. Have since learned she was pregnant again, but have had no chance to examine her.

CASE V.—Mrs. B., aged twenty, seen March 26, 1912, at St. Mary's Hospital with Dr. J. H. Donnelly. Pregnant for the first time. No urine in bladder; tongue coated. Had had numerous convulsions during the day. Uterus emptied by vaginal Cesarean method, cervix admitting only one finger. Child was dead. Mother died at 4 P. M. same day. Another of the type of cases that does not regain consciousness between convulsions.

CASE VI.—Mrs. G., aged twenty-one. Seen with Dr. Hengerer, at the German Hospital, July 22, 1912, at 10 P. M. Had had four convulsions; urine scanty and boiled solid. By the vaginal Cesarean method, I delivered her of a male child, doing version. Mother and child left hospital in good condition. No convulsions following delivery.

CASE VII.—Mrs. C., aged forty. Pregnant for ninth time. Seen with Dr. E. E. Koehler at her home, February 10, 1913. From condition of patient, I diagnosed internal hemorrhage, probably from loosened placenta due to injury. Her condition was extremely critical. I did a vaginal Cesarean section at once, no anesthetic being used. Found placenta loose in uterus, and uterus full of blood; baby dead. Patient put to bed but died shortly after. No doubt this patient could have been saved, had the midwife who was first in attendance called for help sooner.

CASE VIII.—Maria F., aged twenty-five. Seen at Buffalo General Hospital, February 12, 1913. Pregnant for the first time; had had nine convulsions after entering hospital. Urine contained albumen and casts, 60 grams of albumen to 1000 c.c. of urine. Delivered by vaginal Cesarean section of live child, which lived seven hours. Patient had no convulsions after delivery, and left hospital in good condition.

CASE IX.—Mrs. D., aged twenty-two. Pregnant for first time. Seen at Buffalo General Hospital, March 2, 1913, with Dr. Van Peyma, at 8 P. M. Patient admitted at 3.30 P. M. Urine scanty and boiled solid in tube. Unconscious and blind, having convulsions when admitted. She was given veratrum; was bled from the arm; saline

under skin. At 10 P. M. Dr. Getman heard fetal sounds; at 10.30 P. M. I did vaginal Cesarean, delivering by version, a stillborn baby. Patient recovered.

CASE X.—Mrs. C., pregnant for first time. Aged, twenty-four. Sent to St. Mary's Hospital by her physician, Dr. Hill, of Ferry Street. Patient had had numerous convulsions during the forenoon. Husband did not know what they were until told by Dr. Hill. Vaginal Cesarean section at 2 P. M. Child alive. Patient had no more convulsions, and left hospital in good condition.

CASE XI.—Mrs. W., aged twenty-two; first time pregnant. Entered St. Mary's Hospital, May 20, 1913. Seen with her physician, Dr. Flannery. Had had five convulsions before entering hospital. Delivered of stillborn child at 3 A. M., ten convulsions following delivery. Given veratrum veridi, pulse dropped to 60. No convulsions on following day. Patient was seven months pregnant. Left hospital in good condition.

CASE XII.—Mary K., twenty-nine years old, third time pregnant. Sent from Sisters' Hospital to St. Mary's Hospital, June 13, 1913. Mental condition cloudy; urine scant and contained albumen and casts (2 grams to 1000 c.c. of urine). Was treated by sweats, catharsis and fluids until June 16, when she became worse, and I delivered her of a live baby by vaginal Cesarean section at 3 P. M. Baby lived one-half hour, and mother died at 5 A. M. following day.

I think I did wrong to wait as I did. She should have been delivered sooner, but, as she had no convulsions, I thought best to wait.

CASE XIII.—Vaginal Cesarean section for central placenta previa. Mrs. E., aged thirty-three. Pregnant first time. Seen with Dr. Edmonds and Dr. McDowell. Patient full term. Seen 1.15 A. M., September 7, 1913. Diagnosis: central placenta previa. No fetal movements felt for past ten days. First hemorrhage, one month previous—severe. Second hemorrhage, one week before—not so severe. On September 7 had a severe hemorrhage. I found cervix not dilated; bleeding profuse. I did a vaginal Cesarean section, delivering stillborn baby through the placenta. Patient made a good recovery. This would have been a case for abdominal Cesarean section, had there been a live child.

CASE XIV.—Mrs. M., aged twenty-three. Pregnant first time; seen with Dr. C. E. Abbott, December 13, 1913, at St. Mary's Hospital. Patient had been in hospital for three days under Dr. Abbott's care for threatened eclampsia. Blood pressure ranging between 180 and 220. First convulsion 5.30 A. M., December 13; second one at 8.30, A. M. I did a vaginal Cesarean section, delivering live baby. Blood pressure after delivery 180. Two convulsions following delivery. Veratrum given. Urine increased second twenty-four hours after delivery to 118 ounces. Mother and child left hospital in good condition.

This completes the history of these cases. It is unfortunate that we cannot always follow up these cases, especially with reference to future pregnancy.

I regret exceedingly that I did not deliver Case XII sooner. Possibly she might have lived.

VERTEX OCCIPITO-POSTERIOR POSITIONS WITH SPECIAL REFERENCE TO THE SCANZONI MANEUVER.

BY
ARTHUR H. BILL, M. D.,
Western Reserve University,
Cleveland, O.

Much has been written concerning the management of occipito-posterior positions of the vertex. Various methods of procedure have been advocated for use when such positions are present. There seems, however, even at the present time, to be a considerable lack of unanimity of opinion, a failure on the part of men of experience to agree, upon the most acceptable method or methods to be employed. The writer realizes that the method which he favors has not been generally adopted and, in some quarters, has been strongly opposed. Therefore he offers the results of his experience with those cases.

Occipito-posterior positions of vertex presentations furnish a large percentage of the difficulties in which the physician finds himself entangled. They furnish most trying and, at times, apparently insuperable obstacles. The results of delivery under such conditions are often very unsatisfactory and, not infrequently, fatal to the child. More commonly it leaves the mother with more or less serious lacerations, exposes her to septic infection and a long period of, or even permanent, invalidism confronts her.

While it is the writer's intention to speak especially of a method of delivering the child in cases in which the faulty position is persistent, he desires to call attention to the fact that it is not only the second stage of labor which is unduly prolonged, but also that in the first stage of labor abnormal progress shows itself to such an extent as to have a direct bearing upon the progress of labor in the second stage. This is due, in a large per cent. of cases, to a very early rupture of the membranes and we have to deal at once with the problem of a dry labor. The head does not readily engage, and this and its tardy descent make dilatation of the os very slow.

Thus, not infrequently, after hours of good uterine contractions, there is little or no increase in the dilatation. To be sure, with moulding of the child's head which will occur in time, and with the

formation of a large caput succedaneum, further dilatation may take place. Probably the usual practice in such cases is to wait for this to occur and, in the meantime, strive to gain a certain amount of rest for the patient by the occasional use of anodynes. Much may be said in favor of this procedure. To conserve the patient's strength during the long drawn-out first stage, is well worth our while.

A more scientific management of these cases, however, would seem to be artificial dilatation of the os uteri. The introduction of a Voorhees bag will bring about dilatation of the os very quickly; and, at the same time, it will stimulate the uterus to strong contractions. This must certainly appeal to us all, because this method replaces, artificially, something which is lacking—the bag of forewaters. It is the writer's conviction that one reason why so many cases of occipito-posterior positions come to forceps delivery, is that the patient becomes so fatigued and exhausted through a long drawn-out first stage, which involves loss of sleep and lack of nourishment, that little or no strength is left her with which to accomplish the second stage of labor, because of the excessive rotation of the head necessary to make delivery possible. Therefore, if the first stage is shortened by means of the colpeurynter, a larger proportion of patients will be able, of their own strength, to accomplish this rotation of the head and thus make possible a spontaneous delivery of the child. It, too, must be remembered that an excessively prolonged first stage increases the danger to the child, and, under these circumstances, a failing fetal heart and the passage of meconium furnish indications for a hurried delivery. When the membranes remain intact, there is little unusual about the first stage of labor.

In the writer's experience in about fifty per cent. of all cases of occipito-posterior positions rotate spontaneously or with minor assistance on his part. The following are the minor methods which are used by the writer to assist in the rotation of the fetal head: Postural treatment is of only slight benefit, but it may be used in the latter days of pregnancy, early in labor before the head has engaged, and before the membranes have ruptured. The knee-chest position offers a greater chance of throwing the child's back toward the median line of the anterior abdominal wall and thus favors rotation of the head more readily than does the lateral position. Another method which has given satisfactory results in a certain percentage of cases, is to secure further flexion of the head by making pressure with two fingers against the sinciput just in front and on either side of the anterior fontanelle during uterine contrac-

tions. This naturally favors descent of the occiput, flexion improves, and anterior rotation of the occiput is made possible. This anterior rotation of the occiput may be further assisted if the fingers, aiding the flexion, direct the sinciput upward and backward at the same time. Inserting the whole hand into the uterus for the purpose of rotating the head and body of the child is not regarded favorably by the writer, chiefly because it necessitates greater displacement of the presenting part.

Pituitary preparations, by increasing the force and efficiency of the uterine contractions, undoubtedly bring about the desired rotation of the head in a certain number of cases. But these preparations should be given cautiously, and only when the head is in the pelvis.

The special group of cases to which this paper has reference is that of the persistent occipito-posterior positions: those in which the head refuses to rotate either spontaneously or with the aid of any of the minor procedures above mentioned. In these cases the writer has uniformly adopted the so-called Scanzoni maneuver; it has served him well. Indeed, cases usually considered most trying were turned into comparatively simple cases. The writer has made use of this maneuver in 137 cases of occipito-posterior position. Of these, 97 cases were one-parae, 32 cases two-parae, 6 three-parae, and 2 four-parae. In 92 cases the position of the vertex was right occipito-posterior, in 45 cases the vertex was left occipito-posterior. In 61 cases the head was at the pelvic brim, the greatest diameter of it not having passed through. In 48 cases the head was in the pelvic cavity above the spines of the ischia and not entirely passed through the os. In 19 cases the head was in the pelvic cavity and had passed through the os, and in 9 cases the head was at the pelvic outlet. In 6 of the last 9 cases the occiput had rotated into the hollow of the sacrum, the sagittal suture lying practically in the antero-posterior diameter of the pelvis.

In all of these cases the head was rotated with the forceps to an anterior position of the occiput; after rotation the forceps were removed, re-applied, and the head delivered.

The rotation was always made through the smaller arc, *i.e.*, from *R.O.P.* to *R.O.A.*, from *L.O.P.* to *L.O.A.* The occiput was brought as nearly to the median line as possible and, in some cases, carried slightly beyond this point so as to overcorrect the position and overcome any tendency of the head to return to its old position after removal of the blades. In the cases of high- and medium-forceps the occiput rotated through an arc of about 100 to 150

degrees, while in those cases in which the occiput had rotated into the hollow of the sacrum, it was carried through an arc of about 180 degrees. In 109 of the cases the rotation was performed within the cervix; in 28 cases the rotation was done after the cervix had retracted completely or, at least, beyond the greatest circumference of the head. No especial difficulties were encountered, and the rotation was successfully completed in every case.

Inasmuch as success in this method depends entirely upon carefully following a definite technic, and failures are always due to a deviation in some details from this technic, an outline of the general plan of procedure is here given: Too great emphasis cannot be laid upon the making of a correct diagnosis of the exact position of the head. Too often the forceps are applied when the operator does not know the position of the head, consequently does not know how the forceps grasp the head. It is seldom that the sutures and fontanelles cannot be felt; but if, on account of a large caput succedaneum, the sutures cannot be readily made out one can, at least, pass the fingers up far enough to feel an ear and thus make sure of the position the head occupies. Forceps should never be applied until an exact diagnosis of the position of the head has been made.

In applying the forceps a cephalic application should be made; that is, the blades should lie upon the sides of the head diametrically opposite to each other. Any good forceps may be used. The writer prefers the solid blade forceps, because with them it is easier to make an accurate application. The blades slip over the maternal soft parts with ease during the rotation and they are subsequently more easily removed. In making the first application the blades are applied in such a way that the concavity of their pelvic curve looks toward the child's face. Thus in a case of vertex *R.O.P.* the forceps are applied as if one were dealing with a vertex *L.O.A.* and in the case of vertex *L.O.P.* as if it were vertex *R.O.A.* In applying a blade, it is held with the fingers of one hand in a perpendicular manner, while two or more fingers of the other hand are passed into the pelvis to the side on which the blade is to lie, the tips of the fingers entering the os, if it has not entirely retracted. The blade then lies flat against the head and its tip passes along the palmar surface of the fingers between the head and the cervix. While inserting the blades, it is best to keep the handles well up toward the symphysis; this may be done by the thumb of the guiding hand. A slight rotary movement brings the posterior blade to the side of the head. The anterior blade is started in exactly the same way as the posterior; but, with the movement of inserting

the blade into the pelvis is combined a rotary movement using a point, at about the junction of the blade and the shank, as a pivot. The result of these two movements carried out simultaneously is a spiral, sometimes spoken of as the Spiral of La Chappelle, and by the time the blade is inserted, it lies on the anterior side of the head. Attempts at rotating the blade around the head after it is completely inserted, meet with greater difficulty and often fail. After making sure that the blades are evenly applied, the handles are depressed somewhat toward the occiput, for, inasmuch as the head is usually poorly flexed this movement causes the blades to lie more nearly in the occipito-mental diameter. The forceps are then locked and the handles brought well up in the direction of the child's face, until the blades are in the axis of the pelvis. This movement tends to flex the head and may be aided, if necessary, by pressure with the fingers just in front of the anterior fontanelle. The handles are then grasped firmly to keep the forceps well locked, and are carried around with a swinging movement, through a large circle so that, at the completion of the rotation, they point almost directly downward. This large circular movement of the handles keeps the blades continually in the same axis during the rotation and causes the head to turn without difficulty. Failure to describe this circle with the handles is, probably, responsible for many of the failures to complete the rotation. The rotation may be done with one hand and, if the fingers of the other hand are kept on the post-fontanelle, any tendency of the blades to slip around the head may be detected. Slipping of the blades only occurs when a poor application has been made, for instance, when the blades grasp the head obliquely. Usually little force is required to rotate the head; and if one meets with some difficulty in the rotation it is usually overcome by pushing the head up to a slightly higher level in the pelvis. Manipulation rather than force gives success. After rotation has been accomplished the head is drawn down slightly to fix it in the new position. The forceps are then removed inasmuch as they are now upside down. They are then reapplied as in any occipito-anterior position and the head delivered. One important point in the second application is that the posterior blade should be applied first whether it is the right or the left. This tends to prevent the head from slipping back to its old position.

Thus the important points in the procedure are: (*a*) The correct diagnosis of the position of the head. (*b*) The true cephalic application of the forceps. (*c*) The simple rotation of the head, without traction, by a large swinging movement of the handles. (*d*) Drawing the

head down slightly before removing the blades. (*e*) The application of the posterior blade first in reapplying the forceps.

It will be noticed in the foregoing description that rotation of the head is always performed first, that is before any attempts at traction are made, and that the rotation is carried on absolutely independently of traction. In early experience with the Scanzoni maneuver it was the writer's idea that the proper place to rotate the head was low in the pelvis and after it had passed completely through the cervix. Thus in cases in which the head remained at the pelvic brim, or in the pelvis, but still within the cervix, an attempt was made to first draw it down while still in its posterior position and to rotate it only after it had passed through the cervix. The reason for this plan was a feeling that with attempts to rotate within the cervix, there was associated an extra danger of lacerations. Subsequent experience, however, has taught that in a certain number of cases the head cannot be drawn down into the pelvis while lying in a posterior position and that attempts at traction often result in the slipping of the forceps because of an unnatural application, and in consequent injuries to the maternal soft parts as well as to the child's head. Cases have been seen in consultation in which great traction force was used by one or more physicians in an attempt to deliver the child, with no success whatever, and in these same cases it was found that after rotation to an anterior position very little force was needed to accomplish delivery. Injury to the cervix during rotation of the head was not observed in any of the cases, nor did we observe lacerations of the perineum or of the vaginal wall. Lacerations which did occur were only those which would have taken place if the position of the head had been normal from the start. Hence the present plan of rotating the head to an anterior position before any traction is made is advocated whether the head be at the pelvic brim, in the pelvis, at the outlet, or whether it is still within the cervix or not.

The plan of rotating the head, removing the forceps, and allowing the patient to come from under the anesthetic and then wait for a spontaneous delivery has not been followed.

The scientific precision of the maneuver in converting an abnormal position into a normal one and then permitting a normal mechanism of labor, would seem to stamp it an operation far preferable to methods of delivery which consist of a pelvic application of the forceps with subsequent delivery, the operator allowing the occiput to remain posterior in the hope that the head will rotate within the forceps during the traction. Such operations necessitate the use

of far more force and, if the occiput remains to the rear, the danger of laceration of the perineum is increased inasmuch as the vulvar orifice must be dilated to a greater circumference of the head than is the case when the occiput is to the front. The method of making a reverse application of the forceps originally, so that no reapplication will be necessary, is so difficult and confusing as to be impracticable except, possibly, in cases in which the sagittal suture is almost transverse. Podalic version cannot be recommended in that it necessitates a still more abnormal delivery with its self-evident accompanying dangers.

In conclusion we may say that the use of the Scanzoni maneuver makes the management of posterior-positions of the occiput comparatively easy. It may be performed successfully in practically every case, failures being due, as a rule, to deviations from the important steps in the technic, especially that part in which the handles of the forceps describe a large circle during the rotation. The dangers of the procedure, both to the mother and the child, are minimal; and lacerations, when occurring, are only those resulting from the delivery subsequent to rotation.

The writer has found it one of the most useful and gratifying procedures in obstetric practice and would bespeak for it a more general adoption.

The Osborne.

THE SURGICAL TREATMENT OF POSTERIOR UTERINE DISPLACEMENTS WITH REVIEW OF VARIOUS METHODS PAST AND PRESENT.

BY

HAROLD DENMAN MEEKER, M. D.,

Visiting Surgeon to N. Y. Red Cross Hospital. Adjt. Professor of Surgery to N. Y. Polyclinic Hospital,

New York.

(With fifteen illustrations.)

When one's attention is called to the fact that another paper has been written on the subject of posterior uterine displacements, with a sigh the spontaneous query is, "Alas! Is the end not yet?"

A study of eighty methods devised to correct a retroverted uterus, impresses one, not with the skill and comprehensive minds of the operators, but with the ingenuity displayed in playing with a sort of anatomical puzzle, the object of which is to determine the greatest number of means by which the same end may be attained and allow the patient a continued existence.

In 1913 there were 131 papers written on the subject of posterior displacements of the uterus, forty-three in this country and eighty-eight abroad. From January, 1914, to August 1, 1914, seventy-two papers were written on this subject, twenty-two in this country and fifty in other countries.

Many of these papers are but reiterations of what has been previously written, others give most conflicting views as to the effect of certain operations on subsequent pregnancies, while a still smaller number describe a new operation or a modification of an old one.

Credit for pioneer work in this branch of surgery belongs to Alquiè who published his efforts in 1840. Koeberle followed in 1869. Adams in 1880 and Alexander in 1881 were experimenting with the extraperitoneal shortening of the round ligaments. In 1884 Alexander's published work gave this operation world-wide recognition. Within the next five years there were fifteen modifications. During the following fifteen years up to April, 1913, nine modifications have been deemed worthy of publication. With a few exceptions consisting of refinements of technic, all the changes merely complicated the original operation and added nothing to its worth. Edebohls split the entire length of the inguinal canal, drew the ligaments out at the internal ring and closed the wound as in the Bassini operation.

Goldspohn's method was similar. Newman made an incision directly over the internal ring, drew the ligament straight out and secured it in the wound. Then as the simpler means of anchoring the ligament had been disposed of, Martin passed a dressing forceps beneath the skin and subcutaneous tissue from one wound to the other, drew the ligaments through and tied them together. Doleris employed the same method but sutured the ligaments instead of tying them.

Cassati joined the lateral wounds with a curved incision in which the crossed ligaments were sutured. After the possibilities of fixation of the ligaments by the utilization of the tissues in the immediate vicinity of the inguinal canal were apparently exhausted, along came the most recent contributions of Spaceti, Marguis and Figueroa, the latter in April, 1913, who made use of muscle and fascia for fixation of the ligament at a distant point from the internal ring.

Most of the operations in which the round ligaments are shortened intraabdominally have been devised or modified by operators in this country. As in the case of the extraperitoneal operations, the early operations were simple. Then came the modifications, and as the simple procedures were used up, the later operations were turned out with increasing complexity. Of the thirty-two methods described as giving more or less satisfaction to the various inventors, but twenty-three will here be given consideration.

Wertheim, Bode and Wylie made simple folds in the round ligaments. Bardeccu brought the round ligaments together and sutured them to each other. Mann folded the ligaments in triplicate. Bissell cut out a section of the round ligaments and sutured the ends together. Ries put a hole in the anterior uterine wall, brought the round ligament through it and secured it to the anterior uterine surface. Dudley approximated scarified surfaces on the broad ligament, high up between the round ligaments and the uterus, with corresponding scarified areas on the anterior surface of the uterus.

At this juncture there is a lull in the intraabdominal round ligament manipulations, and they are attacked by Schnecking, Klatz, Goffe, Vineberg and others through the vaginal route. This approach never became popular and we soon find the intraabdominal work continuing. Simpson drew the round ligament under the peritoneum of the broad ligament and vesicouterine pouch, to the abdominal wall where it was secured. Willis advanced the round ligaments to a point in the midline of the anterior surface, a half inch from the apex of the uterus, then plicated the broad ligament to within a half inch of the bladder. Coffey seizes the round ligament

one and a half inches from the uterus, stitches it to the anterolateral border of the uterus at the beginning of the vesicouterine fold. The broad ligament is then seized an inch and a half externally, wrapped over the round ligament and stitched to the uterus down to the vesicouterine fold. The round ligament suspension of Gilliam at once commanded attention as being a distinct advance in the operative measures for the relief of a retrodisplaced uterus. Barrett complicated Gilliam's comparatively simple technic by bringing the round ligament out through the aponeurosis and back again into the peritoneal cavity through a second opening. Hall made use of the Gilliam idea when he brought the round ligament through the internal abdominal ring over the rectus muscle and secured it under the aponeurosis.

The Baldy-Webster operation immediately impressed one as having greater merit than many of its predecessors. The round ligaments are grasped through an opening made posteriorly in the broad ligaments, pulled through and sutured to the posterior surface of the uterus. The modifications of this method have consisted in little refinements of technic, such as Soresi's hair-pin and Pollak's extra stitches.

Strobeel, in 1912, described a round ligament suspension, which requires two small vertical incisions on either side of the pubes, in addition to a median incision. The superficial tissues are incised in the lateral wounds down to the fascia, forceps pushed through the fascia and underlying structures into the peritoneal cavity, the round ligaments pulled into the pubic wounds and secured. 1913 yields Buteau's suggestion of anchoring a stout suture firmly into the tissues just above the internal ring. The peritoneum of the distal end of the round ligament is then pierced and the suture run below the serous coat close to the round ligament up to a quarter of an inch from its uterine attachment. The broad ligament is then pierced beneath the ovarian ligament, the needle made to enter the posterior wall of the uterine serous coat, passing downward and inward to the median line, this procedure is repeated on the opposite side. The two free ends are tied behind the uterus with sufficient tension to produce the desired degree of anteflexion.

In the evolutionary development of the operations attaching the uterus to the anterior abdominal wall, credit must be given to Olshausen for giving this plan a lasting stimulus. We may trace the operation through the stage which fastened the uterus in the wound as a sort of plug, to a later method in which the uterine fundus was stitched to the anterior abdominal wall. When this method had

shown itself to be objectionable Kelly bent the uterus over in partial anteversion and fixed the posterior surface of the fundus to the anterior abdominal wall. This change was an improvement but in immobilizing a normally movable organ there were objectionable sequellæ. Then Kelly developed the ventrosuspension which depended for its success on the production of an artificial ligament existing between the anterior abdominal wall and a point just posterior to the uterine fundus. This operation from its very nature, precluded the long list of modifications and stood practically unassailed for several years.

To avoid the buried suture, Martin suggested using the urachus or, when it was not well defined, a loop of peritoneum carried from below upward through a button-hole slit in the fundus. Foster, in 1911, published a ventrosuspension in which peritoneal strips were made to pass through the anterosuperior surface of the uterus and were anchored in the opposite abdominal wall. This operation is much more complicated and causes considerably more tissue trauma. Wereth attached the anterior surface of the uterus to the peritoneum of the anterior pelvic wall. Kaltenbach passed sutures into the fundus through unopened peritoneum.

Methods confining themselves to operative procedures on the uterosacral ligaments alone, have been comparatively few in number. The chief advocates have been Freund and Gottschalk who shorten the ligaments through a vaginal incision and Young who makes his attack through the abdomen. A large number of miscellaneous operations designed to correct posterior displacements, interest us to-day from an historical viewpoint alone.

In 1876 Lenweck opened the description of his operation with the statement that, inasmuch as the operation was not painful, anesthesia was unnecessary. His interesting technic consisted of first splitting the entire length of each side of the cervix with scissors. A knife made of flexible metal was curved to fit the uterine cavity, introduced to the fundus, and the anteriolateral wall of the uterus slit open. The opposite side was treated in a similar manner. The parts bathed with ice water until bleeding began to diminish, then the open wounds were cauterized with carbolic acid and the patient put to bed. After forty-eight hours a dilator was introduced to the fundus, all parts well expanded, and carbolic acid again applied. This treatment was repeated every three days until the twelfth day, then once a week for six weeks.

It is with scarcely less amusement that we read of the operations of Czerny and Leopold who passed long threaded needles from within

the fundus of the uterus through all structures of the abdominal wall. The needles were unthreaded, withdrawn, and the threads tied over the skin. Schuking fastened the fundus of the uterus to the anterior vaginal vault. Sauyer endeavored to hold a uterus forward by passing a deep suture around Douglas' fold through the posterior vaginal vault. Stratz obliterated the cul-de-sac by a colporrhaphy. Duhessen opened the vaginal vault transversely, pushed the bladder back and sutured the corpus uteri to the vagina. Mackenrodt separated the vagina from the bladder through a longitudinal incision and fixed the uterus to the anterior vaginal wall. Gebhard exposed the uterus through a vaginal incision encircling the round ligaments with a long suture which was passed through the abdominal wall and tied over gauze pads.

In this brief review of the chief operations that have gained more or less recognition, one is impressed with the persistent struggle through years to devise a satisfactory operation for a retroverted uterus. The profession is slow to grasp the fact that the ideal operation will never be invented. Methods have been worked out which have proven most satisfactory in properly selected cases, yet when applied to others, the results have been dismal failures. The best results are quite likely to be obtained by one who is not an inventor, for the reason that it is difficult for such an one to approach this pathological condition with an open mind. William Alexander once made the remark before the British Obstetrical Society that he had never tried a ventrosuspension because he felt so much more at home with his own operation. Unfortunately this expresses the attitude of many operators. The extraperitoneal shortening of the round ligaments is an operation which should be condemned, in the first place it is based on a faulty principle.

In Fig. 1, Modified from Gray's Anatomy, is shown the relationship between the point of exit of the round ligament at the internal ring and its point of attachment to the uterus. Were the round ligaments swinging free in the pelvis, traction on the distal part of the ligament would draw the uterus upward as well as forward, but such is not the case. The round ligaments are covered by peritoneum which is attached to the ligament and neighboring structures by loose connective tissue. Its attachment to the pelvic viscera mesially, and its blend with the parietal peritoneum laterally limit its mobility.

Therefore this peritoneum, as shown in Fig. 2 acts as sort of an elastic tunnel through which the round ligament may be drawn for a short distance. Inasmuch as there is a continuous downward pull

of this tunnel and its midportion is at a lower level than the uterine fundus, the traction on the round ligament through the internal abdominal ring must pull the uterus forward and downward and thus increase the prolapsus. The stretch of the peritoneal and connective tissue fibers is depicted in Fig. 2(*b*).

In addition to this mechanical fault, the operation is not without danger even though one eliminate all cases that might fall under the timeworn list of contraindications.

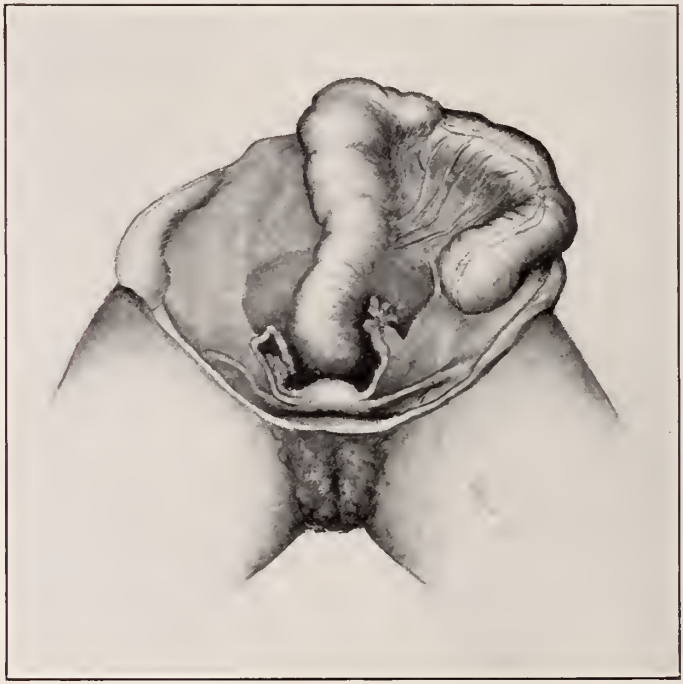


FIG. 1.

At the meeting of the American Gynecological Society in 1913, a prominent gynecologist said, "I should feel ashamed of the man who could not make a diagnosis of uncomplicated retroversion of the uterus." I have two cases to present, either one of which would give this surgeon cause for shame.

The first case, Mrs. N. A., age twenty-six, was operated on at St. Elizabeth's Hospital, N. Y., December, 1910. She had had an Alexander operation performed during the previous year to favor her chances of pregnancy. Almost immediately after this operation

she began to have what was termed intestinal indigestion, manifesting itself by frequent attacks of severe pain in the lower abdomen, obstinate constipation, gastric disturbances and points of tenderness over the appendix and just above the symphysis. Thinking the appendix at fault the abdomen was opened and a strong band of adhesions found between the uterus and a loop of ileum as shown in Fig. 3. In addition the appendix was inflamed and adherent to the ileum. The adhesions between the uterine fundus and the ileum were not and could not have been diagnosed before the operation.

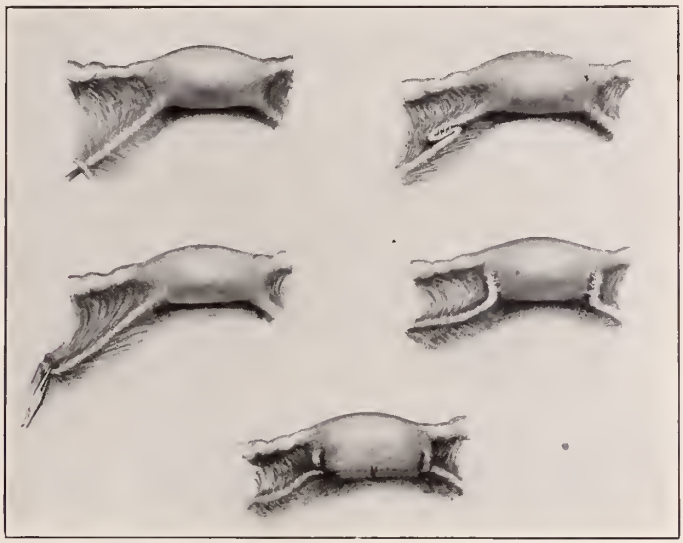


FIG. 2.

The appendix was removed and the adhesions between the uterus and the ileum separated, at once relieving the constriction of the gut. It is of interest to note that while this patient was greatly relieved, her general condition did not improve satisfactorily, her appearance being that of intestinal toxemia. Two years later, after listening to a talk by Sir Arbuthnot Lane, this patient was sent to Dr. L. G. Cole of New York for an *x*-ray examination. The diagnosis of a Lane kink was corroborated at the second laparatomy, the fixation bands freed and the patient is well to-day.

The second case is an equally potent argument against this type of operation. Mrs. L. P., age twenty-eight, operated on at the New York Red Cross Hospital, in July 1913, had been suffering from intestinal stasis for several years, a retroverted uterus pressing on the rectum was said to have been the cause of her trouble and an Alexander operation had been performed. At once she developed severe and constant pain in the left lower abdomen and her difficulty in empty-

ing the bowel became much worse. After an *x*-ray examination of her gastrointestinal tract by Dr. A. J. Quimby of New York, a

FIG. 3.

laparatomy was performed. Several bands contributing to the intestinal stasis were found but the point of interest in connection with the subject under consideration is shown in Fig. 4.

FIG. 4.

An ovarian cyst is seen to have attached itself to a loop of pelvic colon, while the uterus was displaced posteriorly there was no drag on the bowel, but when the uterus was drawn forward, an acute kink was made in the involved intestine.

In July, 1914, Mrs. A. P. was operated on at the N. Y. Red Cross Hospital for a retroverted uterus and colonic stasis. A stout fibrous band was found as seen in Fig. 5 extending from the base of the bladder, over the round ligament and attached to a loop of pelvic colon. Had the round ligament been shortened through the internal abdominal ring and thus elevated, the bladder and the colon would have been dragged toward one another thus causing much distress.

After observing a few such cases as these, and after giving a little thought to the structure of the pelvic tissues, it is difficult to reconcile one's views with the statement of Van Teutem who, in a report this current year (*Zentralbl. f. Gynek.*, 1914, III, No. 1) states that in a study of 1364 patients at the Leyden clinic, the Alexander-Adams operation had given the best results.

Fig. 5.

With modern technic, the objection that one cut through the abdominal wall is more dangerous than two cuts half way through the wall, is not worthy of serious consideration. The intraabdominal shortening of the round ligaments has obvious advantages over the extraperitoneal method. All operations which merely reef the round ligaments, however, have the same fault mechanically as those of the Alexander type. Fig. 2 (*c*) will illustrate this general class, the objection being that the midportion of the round ligament is at a lower level than the internal ring and the uterine fundus, which form the two points of counter-tug, therefore, the uterus must be pulled forward and downward.

The Coffey type and the Baldy-Webster operation are not open to this objection since by transplanting the midportion of the round

ligament, the uterine attachment is at a lower level than the internal ring thus drawing the uterus forward and upward, or at least tending to prevent further downward displacement, as may be seen in Fig. 2, *d* and *e*, page 464.

The Coffey operation has disadvantages which may offset its merits. Aside from considering the possible circulatory constriction in wrapping the broad ligament over the round ligament after it has been attached to the uterus, there exists the very real danger of constricting or kinking the tubes. That this objection is not fanciful is demonstrated by the case of Mrs. J. B. T., operated on in Texas for retroverted uterus. The type of operation was not known until a second laparatomy showed that a Coffey operation had been performed. Either the broad ligament had not been sufficiently lax or the stitches had been taken too high and too far from the uterine margin, causing a downward and inward drag on the tubes. The resulting circulatory disturbance is no doubt responsible for the production of the double hydrosalpinx shown in Fig. 6.

Fig. 6.

The method which I have been using most frequently for more than five years makes use of the Gilliam idea, with slight modifications which tend to simplify rather than complicate the technic. The operation may be performed equally well through the median vertical, or transverse incision following the curve of the suprapubic skin fold. When the median vertical incision is used, the aponeurosis is separated from the underlying muscle by pressure with a gauze pad to a distance of one inch each side of the median line. The right rectus muscle is then displaced to the outer side and the abdominal cavity opened three quarters of an inch to the right of the median line.

After an inspection of the viscera, not overlooking the drainage system, the indicated repair work is attended to before considering the uterine displacement.

The patient is placed in Trendelenburg position to favor the gravitation of intestine out of the pelvis and permit an unobstructed view of the pelvic contents. No pads are used unless necessary, when employed they are moistened, gently spread over the presenting intestine and any necessary pressure made after the pad is in position. Every peritoneal rub invites adhesion formation, the minimum amount of peritoneal manipulation therefore is of obvious advantage. It is quite improper to state that the round ligament should be grasped one or two inches from the uterus, the point at which the ligament should be picked up must be determined not only in each individual case but on each individual round ligament. The point selected on each ligament should be such as will bring the uterus upward and forward when the ligaments are lifted into position, allowing the fundus to swing at least a half inch below the peritoneal level of the anterior abdominal wall.

The selected point must depend upon the length and laxity of the round ligaments. Having determined the proper site a needle threaded with parafined linen or silk is passed underneath the round ligament including as little of the broad ligament as possible. The lubricated thread slides through the tissue with the least amount of trauma and has no tendency to twist the ligament on its long axis while pulling it through, thus constricting its blood supply. The aponeurosis is then retracted on each side of the median line exposing the muscle. At a point three quarters of an inch from the edge of the abdominal incision and about an inch and a half above the symphysis pubes, a pointed forceps is pushed between the muscle fibers downward and outward into the abdominal cavity. The thread surrounding the round ligament is grasped and the knuckle of ligament drawn through the peritoneum and muscle after the manner of the Gilliam technic. Instead, however, of bringing the ligament through the aponeurosis it is secured to the under surface of this fascia with three stitches of linen thread as shown in the illustration (Fig. 7) each including but one half of the ligament to avoid strangulation.

The advantages of stitching the round ligament to the under surface of the aponeurosis, rather than bringing it through and securing it anteriorly are fourfold: Infection is most likely to occur in an otherwise clean case, in the superficial tissues. The aponeurosis is an efficient barrier to the downward spread of infection, when the round ligaments present through an opening in this structure a direct

means of conduction of the infection into the pelvis exists. Again, the muscle tissue has insufficient power to strangulate the round ligaments passing between its fibers. Such is not the case, however, with the strong fibrous structure of the aponeurosis. As all scar tissue tends to contract, the constriction around the ligament may cause a progressive strangulation resulting in a complete atrophy of the structure. In fact, I was first led to alter my technic by the case of an associate which required an abdominal section a few months

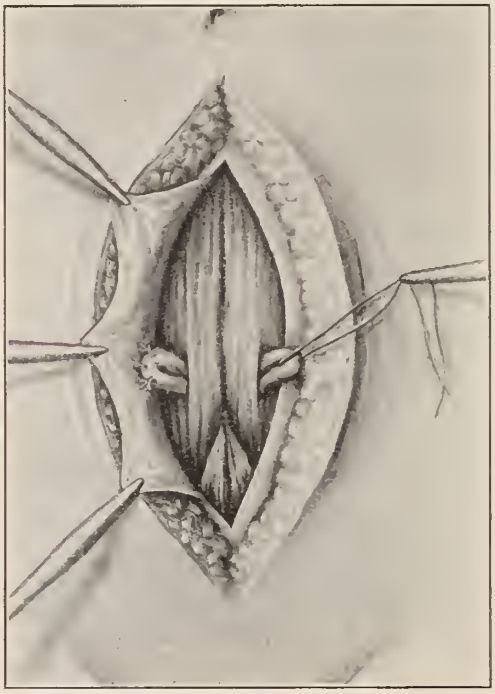


Fig. 7.

after a typical Gilliam operation had been performed, in which just such an atrophy had occurred. The stitches were intact but the knuckle of round ligament had literally been bitten off by the aponeurosis. The operator was positive that the stitches had been properly inserted and had not caused strangulation.

The chief advantage, however, of this technic is in the fact that one-half to one inch less ligament is needed above the peritoneal level of the anterior abdominal wall than is required for the Gilliam operation, thus making the method applicable to a greater number of

cases. The fourth advantage of not bringing the round ligament through the aponeurosis obviates an objection that has been raised to the Gilliam operation, namely that the opening in the aponeurosis invites hernia. I have been able to trace no authentic cases in which this has occurred and think this objection perhaps fanciful. The operation is completed by wound closure in the usual manner, uniting separately five layers of tissue. The curved transverse incision may be used equally well with the vertical in this operation

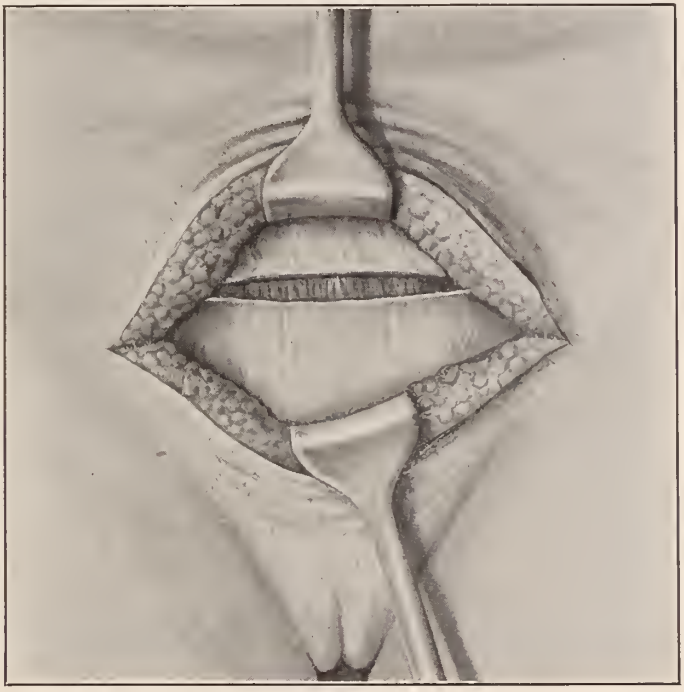


Fig. 8.

and has some advantages. By making the incision in the natural curve of the suprapubic skin fold, closure of the wound may be obtained with an almost invisible scar which has but little tendency to stretch. When the patient cannot see the scar she is not reminded of her "terrible operation" every time she takes a bath. The technic of performing this operation through the transverse incision is shown by the accompanying illustrations.

In Fig. 8 the division of the skin and subcutaneous tissues is

seen following the curve of the suprapubic fold. The aponeurosis is then incised at a level three quarters of an inch higher.

In Fig. 9 the aponeurosis is retracted showing the separation of the right rectus muscle from the left above and from the right pyramidalis below. The pyramidalis overlaps the lower portion of the rectus from which it may be readily separated without destroying any muscle fibers by incising its marginal fascia. The peritoneum is next incised vertically a little to the right of the median line so

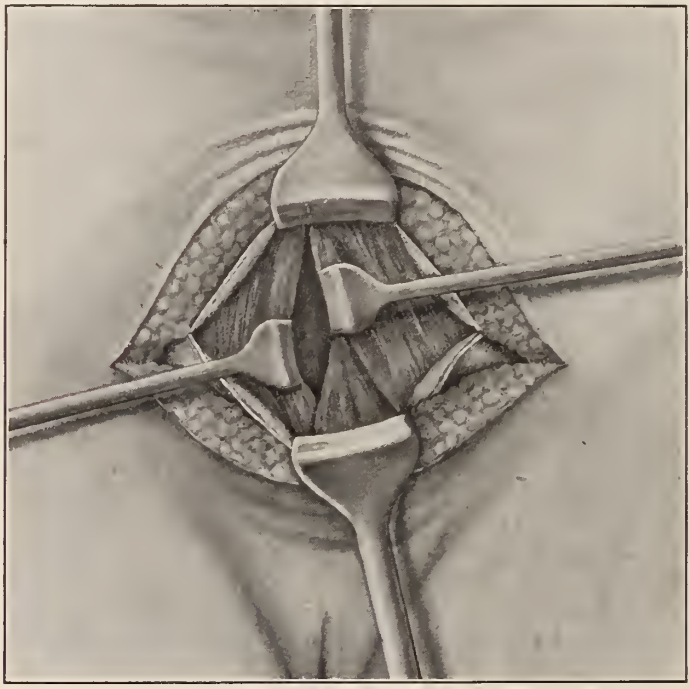


Fig. 9.

that the line of incision will be overlapped by the rectus when this muscle is brought back into position. The round ligaments are picked up and brought through the muscle as previously described, and then attached to the under surface of the lower flap of aponeurosis as shown in Fig. 10.

In following this technic it will be seen that no two important tissues have been incised in the same line thus insuring a strong closure. As there is practically no strain on the skin margins of this incision, the subcuticular stitch of fine catgut is the most satisfactory method

of skin closure. A very common error in technic in the round ligament suspension operation is the inclusion of a considerable portion of the broad ligament in the traction loop passed under the ligament.

In Fig. 11 the proper method is shown on the right and the faulty technic on the left. The kinking of the tube from broad ligament inclusion after the round ligaments have been drawn through the aponeurosis is unquestionably responsible for much of the pain that has aroused criticism of the Gilliam operation.

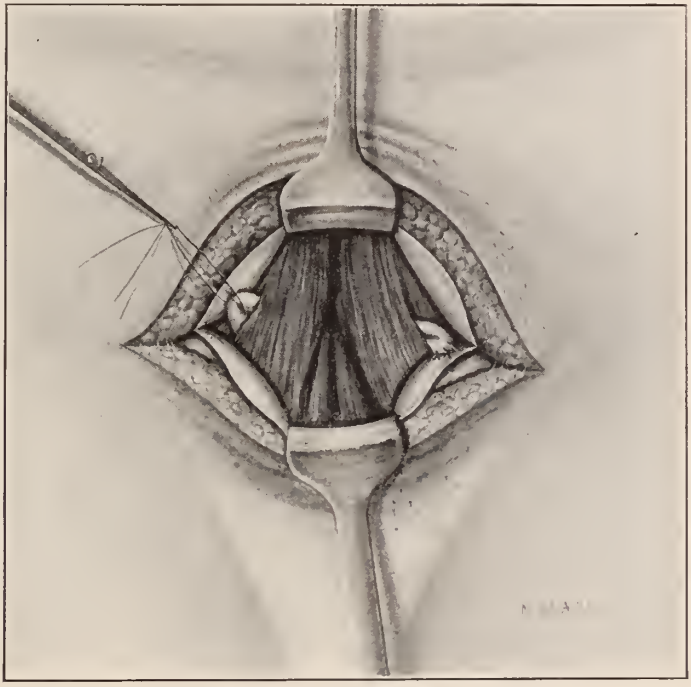


Fig. 10.

In Fig. 12 is shown a marked angulation of the left tube when a considerable portion of the broad ligament was caught up with the round ligament in bringing the knuckle of ligament through the aponeurosis.

On the right is shown another common error of technic. The loop of round ligament has been brought through the aponeurosis too far from the mid-line and too far above the symphysis, making the uterine traction upward, backward and outward instead of

upward and forward. These conditions were produced on the cadaver for purposes of illustration.

The ventro-suspension operation has a field of usefulness when it is not possible to obtain desired results by utilizing the natural uterine supports. The disadvantages of the method are too well known for further comment. The writer has had but three opportunities to inspect abdomens after this operation had been performed.

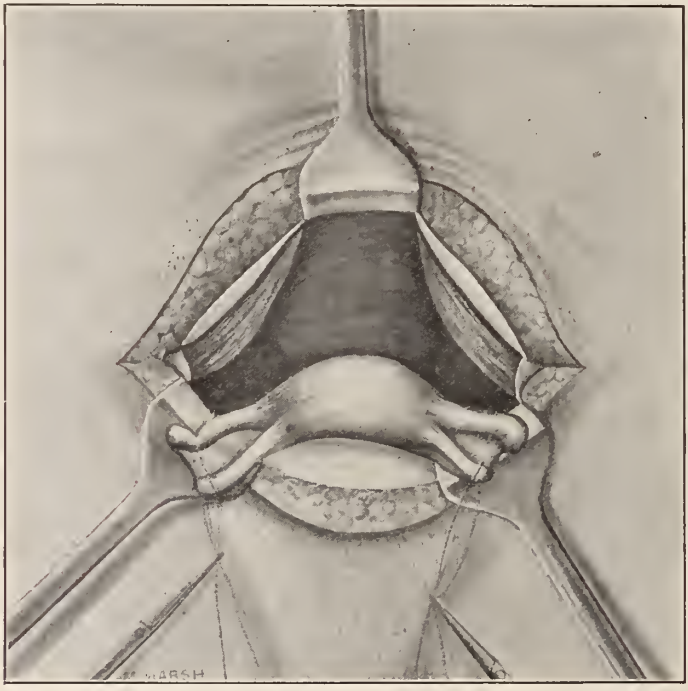


Fig. 11.

The first case came to Vanderbilt Clinic in 1911, complaining of severe pelvic discomfort. She had been operated upon the previous year for "womb trouble"; after several months of relief, her symptoms recurred. On operation the condition seen in Fig. 13 was observed. A firm band had been formed but so stretched as to permit the fundus to drop back into the cul-de-sac. It will be observed that the attachment of this ligament to the uterus was improperly done, being placed anteriorly so that the intraabdominal pressure was exerted on the anterior surface instead of the posterior.

The second case, Mrs. E. P., was operated upon at the New York Polyclinic Hospital in June, 1914. A year previous she had been

operated upon in Berlin for "falling of the womb." After the operation she had a sudden development of distressing bowel trouble for the relief of which she willingly submitted to a second operation. The uterus was firmly attached to the abdominal wall by a strong fibrous band one and one-half inches long. While the uterus in this case was held up out of the pelvis one pathological condition had been replaced by a still more troublesome one.

As may be seen in the illustration (Fig. 14) a band had been formed extending between the terminal portion of the ileum and

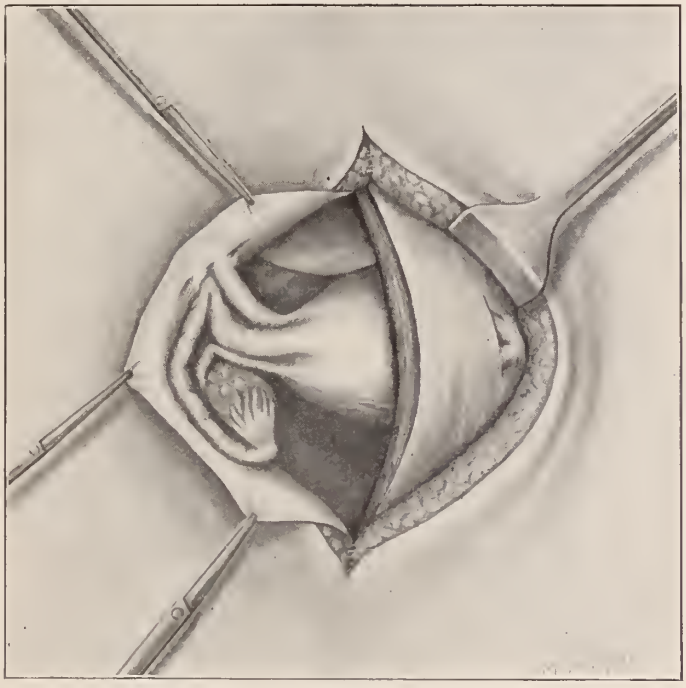


Fig. 12.

the broad ligament just below the uterine end of the right ovarian ligament, with the resulting kinking of the gut when the uterus had been drawn forward.

The third case was a most interesting one, operated upon by Dr. W. S. Bainbridge of New York, in which a loop of ileum had become strangulated between two bands of the artificial ligament resulting from a Kelly ventro-suspension operation performed two years previously.

Fig. 15 emphasizes the fact that even well-developed round ligaments under continued strain may become sufficiently lengthened

to permit a recurrence of a posterior displacement. Miss E. B., aged twenty-four, was operated upon in the New York Polyclinic Hospital during July, 1912, for a retroverted uterus, the modified

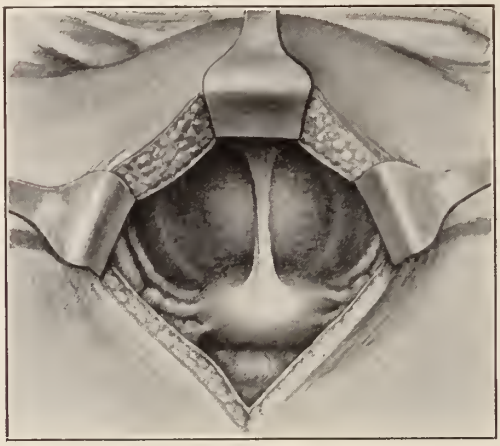


Fig. 13.

Gilliam technic being employed. She left the hospital on the twentieth day with an apparently good result. Two days after reaching her home she developed tonsillitis, this infection was followed by a nervous collapse. The young lady showing no disposition to get out

Fig. 14.

of bed, was allowed to remain on her back for six months. Eight months later the fundus uteri was found in the posterior culdesac. At a second operation the uterus was once more put into position by es-

sentially the same method. The patient was this time given proper after-care and her condition to-day is most satisfactory.

The shortening of the uterosacral ligaments is occasionally of advantage as a supplementary procedure to other operative work, but is unsound as a complete operation in itself. A round ligament suspension should not be tried if the ligaments are very attenuated, or if they are not sufficiently lax to permit the uterus to swing clear of the peritoneal level of the anterior abdominal wall. Should the

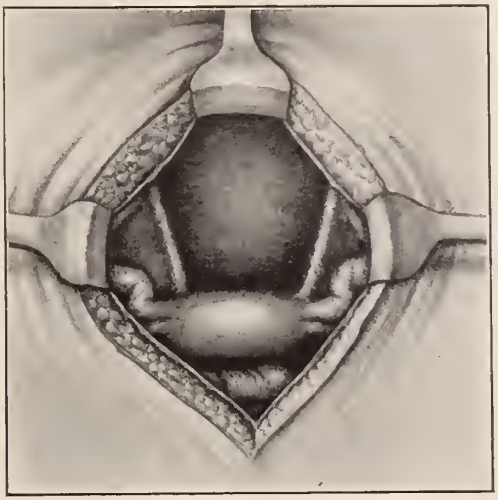


FIG. 15.

uterosacral ligaments have become shortened or thickened, as is very apt to be the case in displacements of long standing, should a thickening of the vesico-uterine fold or any fixation of the broad ligament interfere with the elevation of the uterus, no suspension method should be used, but the uterus swung in the Baldy-Webster cradle. No operation is apt to produce pleasing results when a sound pelvic floor does not exist.

Success in the operative field of posterior uterine displacements can only be achieved by the operator who takes a comprehensive view of the existing pelvic conditions, who is familiar with fundamental anatomic facts, who is not a slave to a method and who possesses the technical skill to adapt his procedure to his case.

220 WEST SEVENTY-NINTH STREET.

THE TREATMENT OF ECLAMPSIA.

BY
ADAM P. LEIGHTON, JR., M. D., L. M. (DUBLIN),
Portland, Maine.

It is doubtful if any consideration of disease therapy presents a wider divergence of opinion and ideas than that involved in a discussion of the time-worn subject of eclampsia and its treatment. Our ignorance of the true etiology of the disorder, combined with the altogether empirical treatment now in vogue, is alone responsible. On one hand we have the advocate of strict conservatism, on the other the advocate of immediate radical operative treatment. There seems to be no "middle ground" between these two factions.

Papers written on the subject of eclampsia are apt to be decidedly similar, generally incorporating numerous theoretical explanations to prove its origin and advocating either a distinctly conservative or active operative treatment, coincident with the author's personal preference. This short dissertation will prove to be no exception, for my somewhat limited experience in the practice of obstetrics precludes the possibility of any true originality.

I have, however, the temerity to offer for discussion, the so-called "Dublin Method" of treatment, or the "Morphine Treatment," as it is wrongly called (for morphine, while playing a most important part, is not the most necessary detail), mentioning its technic in full, combined with a brief recital of statistics, and interspersed with a small amount of personal comment regarding the application and limits of this therapy. It is not a "cure-all" in any sense of the word, and in some cases it may seem to fail and other treatment to be indicated, but I maintain that it gives the best results in the treatment of eclampsia, known to the medical world, if properly, conscientiously and thoroughly applied.

This conservative method of handling eclampsia by avoiding immediate operative interference, and relying upon the use of morphia with combined elimination, is not a new idea. It may be said to be only a revival of an old time practice, much in use several decades ago, which was gradually forced to the background to allow for the more general practice of accouchment forcé or early operative treatment in actual eclampsia. Now, however, it seems that the tide is turning to again favor this conservatism, and accouchment forcé finds increasing disfavor.

The results obtained by adhering to the rules of technic systematized and recommended by Hastings Tweedy of Dublin, will clearly demonstrate the superiority of this therapy over any other. Accouchment forcé in eclampsia is contraindicated and especially harmful. Its chief objectionable point lies in the fact that it leads to severe shock of the already poisoned, irritated nervous system, and it is this shock imposed by immediate delivery after rapid artificial cervical dilitation that oftentimes kills the eclamptic.

I will grant that delivery of the child in the preeclamptic and convulsive stage is to be desired, but not as an important curative agency. Pregnancy must, of course, be considered a predisposing cause of eclampsia, but I doubt if the uterine contents is the actual exciting cause. We are aware of the deleterious effect of the toxemia or eclamptic poison on the child and that it is this, which adds considerably to the fetal mortality, so for that reason we would possibly obviate the death of the child by early delivery. Because of the truth of this statement, I believe that it is good treatment to induce labor in a patient, who being near to, or at, full term, shows aggravating and increasing preeclamptic symptoms. There is little shock entailed and it may be safely and successfully obtained by the use of a Cooke's ring and cervical packing. However, in actual eclampsia we have a different condition of affairs, and to attempt forcible delivery would be the wrong procedure, the reasons having been previously stated.

The treatment of eclampsia should be properly considered under two heads—prophylactic and curative. I shall neglect reference to the former as the rules for the proper hygiene of pregnancy are too well known to allow for tiresome repetition.

The Dublin method of treatment rests upon four principles:

1. Delivery when possible only. Accouchment forcé is not advocated in any form.
2. Limit metabolism and avoid further metabolism. This is done by starvation, morphine and gastric lavage.
3. Aid excretion. Purging and irrigation of the bowels. Sweating is never done! Bleeding in specially selected cases. Infusion of the breasts with a sodium bicarbonate solution. Saline is not used as it is not eliminated in kidney disease and it leads to locking up of fluid in the more solid tissues.
4. Treatment of special signs, such as respiratory weakness, cardiac weakness, etc. Morphine is used only to control the fits.

On commencement of the treatment, one-half grain of morphine is given, followed every two hours with a quarter grain while the fits persist, until two grains in the twenty-four hours are given. Three grains may be given in many cases. When respirations fall to six or seven a minute, it is an indication that the limit for administration of morphine has been reached. Scopolamine or atropine may be substituted.

The stomach is washed out and a purgative poured through the tube. There is no importance to the nature of the purgative; it must be efficient. After stomach washing, a catheter is passed, the urine drawn, measured and examined. The patient is turned on her side and the rectum and lower bowel thoroughly washed out with a solution of sodium bicarbonate through a long rubber colon tube. Lavage must be very thorough and the procedure persisted in until large amounts of fecal matter have been washed out. The passing of the colon tube is a most important question of technic. The simple introduction of the tube through the anal opening until the greater part has disappeared is no proof that the tube has passed to the sigmoid. On the other hand, more frequently does it curl up in the pouch of the rectum; therefore, we only get a return flow from the rectum during irrigation. A digital rectal examination should be made in each case to insure the proper insertion of the tube.

When the bowel is well cleared, leave one and a half pints of the sodium bicarbonate solution in the rectum. One other point is well worth mentioning, I have noted that the irrigation is productive of better results if massage of the abdomen is combined.

If the urine remains scanty, submammary infusion of the same kind of a solution is practised. Lay the comatose patient on her side, almost on her face, so that the mucus may run out. This is a matter of great importance, for if a patient lies on her back, mucus and saliva trickles over the insensitive larynx and adds to the edema of the lungs. I have no doubt but that this is the most fruitful cause of the pulmonary edema of eclamptics.

Labor is never induced at this juncture, but if it should take place (as it generally does) its progress, as a rule, is never interfered with. When labor has continued to a point where the os is sufficiently dilated, forceps may be applied and the patient aided in her delivery.

The treatment outlined by Stroganoff of St. Petersburg, is similar, except that he uses chloral in large doses, by the rectum, in conjunction with the morphia. Irrigation, examination, lavage, etc., is done with light chloroform anesthesia.

With this condensed presentment of the treatment, may I give a few figures and statistics on which to base my argument in favor of the conservative or expectant treatment?

The rate of mortality in the United States, gathered from nine leading lying-in hospitals during the recent period of five years, is 38.4 per cent. in seventy-eight cases. The Royal Maternity of Edinburgh gives 66.6 per cent. Guy's Hospital in London about 25 per cent. Williams gives a mortality of 20 per cent. to 25 per cent. DeLee gives over 20 per cent. McPherson of the New York Lying-in Hospital states that theirs is 30.8 per cent. Engleman gives 21 per cent. Edgar states his as 20 per cent. Duhrssen, of vaginal Cesarean fame, gives 16 per cent. These figures are all given by men who believe in accouchement forcé or immediate delivery.

Now let us note the results gained by Stronganoff and Tweedy, these men, as I have before mentioned, following modes of treatment which are nearly identical. From 1903 to 1910, Tweedy treated sixty-six cases after his method, with six deaths, a mortality of 9.9 per cent. In the year 1911, he treated eight more without any deaths, hence his record is 8.11 per cent. in seventy-four cases. Since that year, he tells me that he has materially decreased that per cent. of mortality.

Stronganoff has treated personally three hundred and sixty cases of eclampsia, with a maternal mortality of 6.6 per cent. and a fetal mortality of 21.6 per cent. Six hundred cases have been treated in Russia according to his method, with a maternal mortality of 8 per cent. and a fetal mortality of 21 per cent. Sixty-one cases have been treated in Germany in the same way with a maternal mortality of 6.5 per cent. and a fetal mortality of 18 per cent. Roth recently reported from Dresden thirty-one cases so treated with only one casualty.

These statistics must command one's attention. They are gleaned from the results of the treatment of a large number of cases extending over a long period of time. I realize that medical journals are replete with statistics and reports of special treatments for this disease, and that the results are uniformly good in most cases, as indicated in per cent. mortality, but can any of them show results like unto those which I have just stated? Tweedy's fetal mortality in the seventy-four cases just mentioned was 30 per cent. Stronganoff's I quoted with his maternal mortality. Fetal mortality in our text-books, outside of expectant treatment, is generally given from 33 per cent. to 50 per cent.

As far as abdominal Cesarean section is concerned, it must be admitted that perhaps here we have the solution of the question in some cases. I doubt if we may place it within the limits of strict conservatism, but I venture to say that occasionally we will resort to its use in eclampsia. Theoretically, Cesarean section would seem to be the most rational method of treatment in eclampsia, if one considers that the child in utero is the actual exciting cause of the disease. Too, acting upon this assumption, immediate evacuation of the uterus is desired. Comparing the results obtained by the several forms of accouchement forcé, with the results gained through Cesarean section (as have been presented by Peterson of Ann Arbor and others) it is evident that fetal and maternal mortality is materially lessened by the latter therapy. However, the statistics show that the per cent. mortality is much greater than that resulting from conservative treatment, such as I have outlined in this paper.

Some cases of active eclampsia demand immediate operative treatment. I should not want to see a woman die undelivered for obvious reasons, and eclampsia of a fulminating variety in which the symptoms steadily increase and which are not properly controlled by sedative and eliminative treatment, indicates operative interference. Here Cesarean section should be considered.

The most valuable point in the treatment of eclampsia with perhaps the single exception of the administration of morphine in sufficient amounts to control the fits, is ELIMINATION! Elimination in this sense means a great deal more than simply giving an enema and a cathartic. It means that the attendant must give hours of time to the proper eliminative technic. Prolonged irrigation of the bowels will bring forth extraordinary amounts of putrefactive intestinal debris and fecal material. This is of prime importance as a curative agency.

Two other points of value in the treatment of this malady are attention to the diet and venesection. Starvation should be practised for three days following the return of consciousness, then when food finally has to be given it should be of the blandest sort. I find that a diet of malted milk made with water is adequate for some days, administering it in small quantities. The harmful effect of food at these times has been satisfactorily proven in the few cases which have come to my attention, and I am convinced that food plays a most important part in the etiology of eclampsia, if it is not the actual exciting cause. In the preeclamptic stage there is aberration of digestion and in the period of unconsciousness

digestion is absolutely in abeyance. It is at these times that food exerts its most harmful action. We all think, too, that we are supporting the patient's strength and enhancing the ultimate possibility of recovery by administering nourishment after a woman has struggled to consciousness through this terrible disease. This is the mistake. We should withhold food for a considerable length of time. I have no doubt that proteid and foods of a large nitrogenous content are the chief trouble makers. For this reason it seems that carbohydrates are more desirable when nourishment finally has to be given.

In venesection we certainly have a valuable aid in the treatment of some cases. A high blood-pressure with cyanosis suggests venesection, and decided benefit is gained by the loss of some 500 c.c. of blood. The withdrawal of a pint of blood removes considerable poison and also favors diuresis. I believe that many of the good results gained by immediate delivery and credited to the fact that the uterus was emptied, really are due to the excessive hemorrhage at the time. Zweifel, since April, 1911, has applied venesection in eighty-nine cases, combined with the Stroganoff treatment, and has greatly improved his maternal mortality. This therapeutic measure of venesection was much in use fifty years ago, but suddenly fell into disuse. However, it seems at present that there is a tendency to once again employ it more generally.

In the treatment of eclampsia, then, avoid first accouchment forcé. Vapor baths, or any means to promote diaphoresis, are obviously improper methods. Eclamptics are suffering from a paucity of fluid in the circulation, and this in spite of the tissues being possibly solid with edema. What is wanted is a less saturated condition of the blood, and it is impossible to suppose that profuse sweating can have any other action than to increase this abnormality. Only a minimum of toxins can be thus eliminated, if any.

No other disease better repays the attendant for personal supervision. Patients with profound toxemia make a slow recovery. Elimination is always slow. Heart failure may supervene, although no new poison may be added to the blood. For these reasons a certain number of deaths must be expected; nevertheless, it is impossible any longer to pretend that the treatment of eclampsia is either empirical or useless.

SOME CONSIDERATIONS ON THE NEEDS AND USES OF ABDOMINAL CESAREAN SECTION.

BY
WILLIAM MORTIMER BROWN, M. D.,
Rochester, N. Y.

(With two illustrations.)

A CONSCIENTIOUS reflection on an obstetrical experience that has been somewhat extended and intensely practical, comprising the personal care of several thousand cases during the past twenty-five years, has given me a wholesome fear of the dangers of difficult pelvic deliveries and of the pitiful results that attend them.

Our memories are replete with pictures of those cases to which we have been called to do a more or less destructive operation on both mother and child. We have finished these cases, possibly with the loss of the child, certainly with the permanent injury or the death of the mother. We have spent hours of time, and great labor, in cleaning and sewing, in an attempt to restore the bruised, torn, and infected parts to something of their original condition and natural function. By far the greater part of our gynecological work comes as the direct result of pelvic deliveries in unsuitable cases.

We have only to look about us at the invalid women and defective children to be made to feel that, if the pelvic route was, at first, the ideal highway into this world, then some very serious error has been made in the maintenance of that highway.

There are, of course, many cases where the pelvis is so distorted and blocked that its traverse is impossible, and a new way must be found. These cases I will not discuss, at this time, for in consideration of them there is no opportunity for debate. I do want, however, to speak of those other cases which, because they are less apparent, are so often "messed up" because of insufficient study beforehand.

I think we must all admit that, in the large number of cases, labor is more difficult to-day than it was a generation ago; that disease and the artificialities of civilization are increasing deformities and defects of structure and forces of delivery; that, in short, we are confronted with conditions which, with increasing frequency, demand the abandonment of the old highway of birth. Are we doing all that lies in our power to make the substitute better than the

original in its defective condition? Are we putting enough study into the individual case to be able to choose, intelligently, whether to travel the old or the new way? The necessity is upon us so to train our abilities of diagnosis that we may measure the elements of each case and estimate the difficulties we are to meet. The "test of labor" is the makeshift of incompetence, and must be eliminated by careful training in diagnosis. This, then, I hold to be the first great need of obstetrics, and especially of the successful use of abdominal delivery, the detailed preliminary estimation of each individual case by one trained in this form of diagnosis.

Now, after examination, what? The tendency for several years has been to broaden the scope of the Cesarean operation, and to place under its beneficence many cases which, a few years ago, were considered only for pelvic delivery. This is, I believe, because we are getting constantly better results in our Cesarean operations. These improved results are due not only to improved technic, but also to the fact that our increasing confidence leads us to earlier and bolder action in these "border line" cases. Therefore, I would say that the "courage of our convictions," and the early adoption of this procedure in doubtful cases is the second great need of the delivery by the abdominal route, since we cannot expect to obtain good results where a poor one has been assured by delay and improper handling.

In considering the further need of the operation for suprapubic delivery, I would emphasize the importance of the careful training of the operator and the constant improvement or development of his technic, both in the preparation of his patient and in the detail of the operation.

Is it to be wondered at that, a few years ago, the results were not all that we had a right to expect, when we waited for the patient to begin labor and were thus compelled to do the operation at an inconvenient time and in a hurried manner without proper preparation of the patient.

But what about the operator? Of course the operation should be done only by one who is familiar with, and is trained in, general abdominal surgery. Greater success will be secured, however, if he is also trained in this special operation. This observation holds as true in this as in any other line of work, the one most familiar with the routine will do the better job.

The technic, the manner, and the steps of the operation must, of course, be left to the operator at the time. I feel, nevertheless, that there has been too much of the spectacular in this operation in

the past; that accuracy and skilful precision have been lost in the waving of banners and the blare of the trumpet. There is nothing about this operation, in the ideal case, to demand the sacrifice of good work for the sake of speed. I find that my patients do better when I take thirty minutes for the operation than they used to when I took from eighteen to twenty. I know that I feel less anxious

FIG. 1.

about my cases now than I did then, since I have the assurance that I have not been careless in my work and that my suture lines are to be depended upon.

The question of the after-care of these patients is not very different from that involved in any abdominal operation, except that it must be considered also from the obstetrical standpoint, which will be largely a matter of postural drainage.

In brief, my conclusions on the necessities of the Cesarean operation are: First, a more efficient training in the preliminary examination of patients, that they may earlier have the benefit of an operation under ideal conditions, *i.e.*, in a hospital, at a specified time, and after adequate preparation. Second, confidence to do these operations under these ideal conditions, rather than submit the patient to a test of labor and a subsequent version or high forceps with a

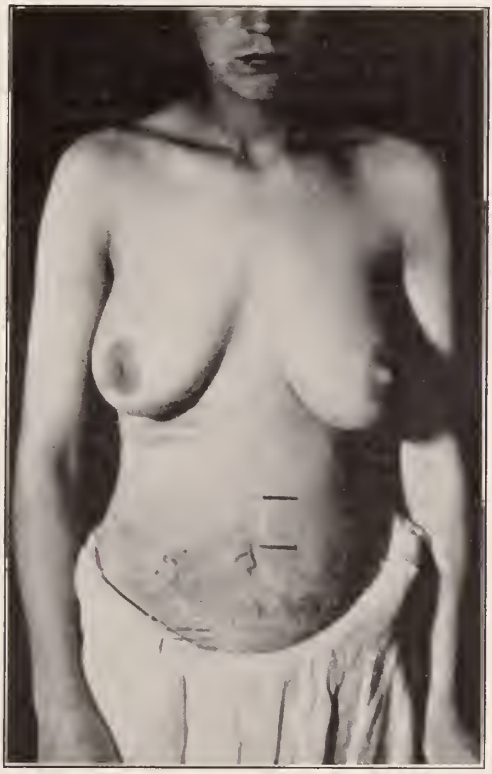


FIG. 2.—Scar seven centimeters long entirely above the umbilicus.

possible or probable destruction of the child and injury or loss of the mother. Third, a trained operator, with a conservative and efficient technic.

Given these conditions, and the mortality from delivery by the abdominal route will be as low as from the simplest laparotomy, and the morbidity will be far less than from pelvic deliveries, while the mortality and morbidity of the children should be nothing.

In submitting the accompanying series of cases, I regret that many

No.	Name	Date	Para	Indication	Result		Remarks
					Mother	Child	
1	R. J.	9/26 1907	I	Rachitic dwarf.....	Cure.	Died in fourth week marasmus.	
2	A. C.	10/29 1908	I	Rachitic dwarf.....	Cure.	Good.	
3	C. T.	12/7 1908	II	Previous high forceps, and dead child; ext. conj. 15 1/2 cm.	Cure.	Bifid spine; died in sixth week	
4	A. C.	10/9 1909	II	Same as No. 2.....	Cure.	Good.	
5	E. M.	6/11 1910	I	Congenital idiot; int. conj. 5 cm.; in labor 45 days.	Cure.	Stillborn.	Badly infected; panhysterectomy. *c* drainage.
6	E. F.	9/31 1910	I	Tubercular spine; contracted and tilted pelvis.	Died in fourth week.	Good	Patient was recovered from operation and discharged whentaken *c* acute pulmonary consolidation.
7	S. P.	11/28 1910	II	Previous high forceps and dead child; ext. conj. 17 cm.	Cure.	Good.	
8	K. F.	12/12 1910	I	30 hours labor; head floating; int. conj. 8 cm.	Cure.	Good.	
9	M. R.	5/5 1911	Multi	Ankylosis of hips; tubercular.	Cure.	Good.	
10	K. M.	6/18 1911	I	Previous high forceps; skull fractured; head floating.	Cure.	Good.	
11	M.R.	10/8 1911	I	Male pelvis; contracted outlet; 18 hours in labor.	Cure.	Good.	
12	K. D.	12/29 1911	I	Contracted pelvis; int. conj. 8 cm.	Cure.	Good.	
13	E. S.	2/8 1912	II	Placenta previa central.	Cure.	Good.	Pneumonia on third day: Ruptured incision by coughing; expelling large amt. of omentum, this was amputated and wound reclosed.
14	A. G.	7/15 1912	I	Pulmonary tuberculosis and endocarditis.	Cure.	Good.	
15	C. M.	10/24 1912	VIII	Adenocarcinoma of cervix filling vagina.	Cure.	Good.	

No.	Name	Date	Para	Indication	Result		Remarks
					Mother	Child	
16	P. L.	11/5 1912	I	15 hours in labor; head floating; int. conj. 8 cm.	Cure.	Good.	
17	E. G.	1/20 1913	III	Previous high forceps operations: 2 dead children; mod. contraction.	Cure.	Good.	
18	E. B.	1/24 1913	II	Central placenta previa.	Cure.	Good.	
19	M. M.	4/21 1913	I	Ext. conj. 17.5 cm...	Cure.	Good.	
20	M. R.	5/6 1913	Multi	Also Case 9.....	Cure.	Good.	
21	M. S.	5/13 1913	.....	Int. conj. 6.5 cm.; 3 days labor.	Cure.	Good.	
22	R. B.	5/30 1913	V	Central placenta previa.	Cure.	Good.	
23	E. B.	7/17 1913	I	Ext. conj. 18 cm.; head floating.	Cure.	Good.	
24	F. B.	10/1 1913	Multi	Amputated cervix; cicatricial obstruction.	Cure.	Good.	
25	Mrs. Z.	10/24 1913	I	Extreme toxemia, 2 nephritis; edema and retinal degeneration; head floating.	Cure.	Good.	
26	M. S.	1/9 1914	I	Ext. conj. 16 cm.; 2 days labor.	Cure.	Good.	
27	M. R.	3/9 1914	I	20 hours in labor; contracted pelvis.	Cure.	Good.	Futile attempts at forceps delivery by outside physician.
28	K. F.	4/20 1914	II	Also Case 8.....	Cure.	Good.	
29	M. S.	5/20 1914	I	Head floating; int. conj. 7.5 cm.	Cure.	Good.	
30	G. McF.	8/10 1914	I	Deformity from tubercular spine and hip.	Cure.	Good.	
31	O. S.	8/20 1914	I	Contracted pelvis; 2 days labor; head floating.	Death.	Good.	We were deceived as to the handling patient had outside.
32	E. L.	9/7 1914	II	Mod. contracted and tilted pelvis from lateral curve.	Cure.	Good.	Previous labor was high forceps and baby's skull was fractured.

of the observations on these patients were mislaid or not recorded at the hospital, so that I am unable to give all of the details that were before us to determine the choice of procedure. I am able to say that each case was given the benefit of careful thought to all elements of the situation.

Up to, and including, Case XI, the operation was done by the long incision, with the turning out of the uterus before opening it. Since then, all cases have been done with the short, high incision.

I enclose pictures of Cases I and XIV, the one showing extreme structural deformity of the whole skeleton, the other how slight is the disfigurement from the scar.

1776 East Ave.

August E. Cordes, M. D.

Born Sept. 25, 1843. Died Aug. 4, 1914.

IN MEMORIAM.

DR. AUGUST E. CORDES.

BY

E. GUSTAV ZINKE.

(With portrait.)

Dr. August Elisee Cordes, whose death occurred August 4, 1914, was born at Lyon, France, September 25, 1843. He graduated in medicine from the University of Paris and received his degree in 1869. He took special courses in obstetrics and diseases of women at Dublin and Prague. When, in 1870, the war broke out between France and Germany he returned to his native land, served in the Army Medical Corps, and rendered distinguished services for which he was decorated by the French government. At the close of the war he settled in Geneva. When the Medical Faculty of Geneva was inaugurated, he was made "privat docent" in obstetrics. In 1886 he was made "Chirurgien-adjoint" of the Obstetrical and Gynecological Clinic at the Maternity at Geneva. Cordes was a frequent contributor to medical journals in France, England and the United States of North America. He translated, from the English, Barnes' Lessons on Obstetric Operations and Barnes' Treatise on Female Diseases. Cordes was a frequent attendant of the International Congress of Medical Sciences. He was one of the general secretaries of the International Congress of Obstetrics and Gynecology at Geneva, 1896. He was an active member of the Medical Society of Geneva and of the Society of Obstetrics and Gynecology of Suisse Romaine. He was president of both of these societies. He was a Fellow of the Obstetrical Society of London, of the British Medical Association, of British Gynecological Society, and a Founder of the Obstetric and Gynecological Society of Paris. Thanks to his vast knowledge and splendid character, his discussions of papers and presentation of essays bristling with originality of views and expressions, made him many warm and admiring friends. During the past few years, on account of ill-health and severe suffering, he had been compelled to remain at his home. He passed away in the seventy-first year of his life, after great and prolonged suffering.

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